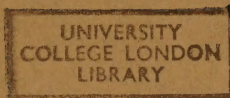


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Anatolia: An Archaeological Renaissance*

by SETON H. F. LLOYD

I believe that there is one commonly accepted practice for those recently appointed to a Chair, from which they must give an inaugural address. They may, and often do, feel inclined to review retrospectively the immediate situation in the field of research with which they personally are concerned. They may even feel themselves called upon to cover the whole of that field, in a general appraisal of recent discoveries or conclusions: and they may add some pointer to the direction in which their own enquiries are leading them. In my own present case there is a secondary reason why this particular course would seem desirable. Because, at the beginning of the present academic year, I have been in agreement with my colleagues here, that each of us, in his own particular field, should attempt just such a summary as I have referred to, for the sake of its obvious and practical usefulness. Perhaps then, this afternoon, the two intentions may be considered conveniently to coincide, and a dual purpose may be served by the address which I have prepared.

But now I must confess that the vast scope of the subject which might be implied in my own case did at first appear extremely intimidating. For one must bear in mind that the term Western Asia, if taken at its face value, must include the whole distorted anatomy of Breasted's so-called 'Fertile Crescent', (to which, incidentally, new areas of comparable territory seem almost annually to be annexed). It would include the original enclave, consisting of the Levant states, Mesopotamia and Iran; but it would also involve one in an excursion southward through the trading emporia of the Persian Gulf, and northward across the land-bridge of Anatolia. Indeed, as the subjects and countries which ought to be considered seemed to me to increase in numbers, I found my eye returning repeatedly with familiar affection to the areas which I know best; and particularly to Iraq and Turkey, whose archaeological fortunes it has been my duty to follow throughout the past three decades. I began to wish that I might restrict myself to these two countries: and I felt suddenly encouraged to do so, because I happened to be reading an Inaugural Lecture given in this university seventy years ago by one of the great antiquarians of that time, Professor A. E. Housman. In fact, I had come upon a characteristically forthright passage, which seemed surprisingly to meet my present case.

* An Inaugural Lecture given at the Institute under the Chairmanship of the Director on 29th October, 1963.

'If,' he said, 'a certain department of knowledge specially attracts a man, let him study that, and study it because it attracts him; and let him not fabricate excuses for that which requires no excuse, but rest assured that the reason why it most attracts him is that it is best for him.'¹

Encouraged in this way then by advice from so irreproachable a source, to deal only with the subjects which I know best, I propose this afternoon to speak first about archaeological developments in Mesopotamia; and then, because these have to some extent been restricted in recent years by political *force majeure*, to review in greater detail developments in Anatolia, where a veritable archaeological renaissance does at present seem to be in progress.

To think first then about Iraq; it is now almost ten years since my predecessor commemorated the Silver Jubilee of the British School there, by summarising the work which it had done under his direction, This he did with characteristic thoroughness in an admirable handbook.² And it is interesting to reflect that, with the exception of the striking additions to the finds at Nimrud, made by the expedition latterly under the direction of Mr. David Oates, that summary can still today be used for reference, as being substantially up-to-date. In fact, to anyone attending the Assyriological meeting which took place in London as recently as last July,³ it must have been clear how the subjects of Mesopotamian research considered most topical for discussion, were for the most part academic, philological and, as one might say, retrospective. Apart from Professor Lenzen's Protoliterate finds at Warka (which increase in interest almost in proportion to their complexity), we listened to and discussed new conclusions of scholars working outside the actual arena of Mesopotamian field archaeology; constructive and important commentaries, it is true; but part of what one might call the long 'mopping-up' operation, after 'engagements' which took place more than a decade, and sometimes several decades, ago. The truth is, that great strides have not been made there in actual discovery during the last ten years; there has been no arresting or revealing revelation to change or redirect the course of our inferred reconstruction of Mesopotamian history.

And yet, we have already mentioned one cause of this 'work-to-rule' which has recently imposed itself on excavators in Iraq, defining it non-committally as we did, as 'political *force-majeur*'. And now, if we take a wider look at the Mesopotamian horizon since the war ended seventeen years ago, we may be able to detect a happier circumstance, perhaps attributable to the same main

¹ Ed. John Carter, *A. E. Houseman: Selected Prose*, Cambridge University Press, 1961.

² M. E. L. Mallowan, *Twenty-five years of Mesopotamian Discovery*, British School of Archaeology in Iraq, London, 1956.

³ XII^e Rencontre Assyriologique Internationale, 'Warfare in the Ancient Near East', *Iraq*, Vol. XXV/2, 110-193, 1963.

cause. For one may say, with some truth, that the most revolutionary and informative discoveries in Iraq during that period have been made outside the milieu of conventional archaeology and the investigation of individual sites. They seem to me in fact to have been connected with the actual geophysical formation of the country itself and the economics of its exploitation in ancient times. As a result, our knowledge in these matters today is on an immensely firmer footing than it was for instance during the nineteen-forties.

In the first place, the increasing exploitation of Iraq's immense oil resources has brought to the country so many field geologists, that little now remains to be learnt about the physical structure of the river-valleys; and there have been those among them who have been sufficiently interested to help apply their findings to the solution of archaeological problems. Then, in the realm of local government, there have been repeated attempts at long-term planning, for instance for the improvement and development of agriculture. And these have brought to the country relays of foreign specialists in such subjects as irrigation, soil-conservation and fertilization, forestry and so forth. Conveniently for archaeology, some people too have done much preliminary research into the historical background of their particular subjects. All this has been supported by intensive aerial photography: and this has perhaps proved more revealing to archaeologists than to anyone else. Let us take some specific examples of this important auxiliary form of research.

First and foremost of course, there is the disturbing and perversely controversial problem of the southern coast-line. For anyone like myself who had basked so complacently and for so long in the comfortably acceptable interpretation of the Mesopotamian delta, the revolutionary discovery in this respect made in 1952 was something of a shock.

We had observed the two rivers bringing down from the mountains in the north their prodigious load of silt (up to three million tons a day, we are now told), and depositing it around their slow-flowing lower courses. So we pictured for our students how they had created their own delta by filling up the one-time head of the Persian Gulf. Geologists of that time assured us that the alluvium had in places been tested up to a depth of as much as thirty feet, and amateur observers had calculated the speed at which the coast-line was advancing southward. But now all this is a thing of the past.

As A. E. Housman again reminds us 'The house of delusion is cheap to build, but draughty to live in, and ready at any instant to fall'. The collapse in this case was due to Messrs. Lees and Falcon,⁴ who eleven years ago were able to examine the situation with proper up-to-date equipment and to understand

⁴ G. M. Lees and N. L. Falcon, 'The Geographical History of the Mesopotamian plains,' *Geographical Journal*, 118, Part I, 1952.

the effects of the antecline in geological development. Their findings were afterwards summarised with most acceptable brevity by H. E. Wright in an article called 'Geological Aspects of Mesopotamian Archaeology'⁵; and we now understand that the whole Mesopotamian valley-bottom is sinking in level at a rate sufficient to accommodate the accumulating alluvial deposit. The effect of the antecline is correspondingly to raise the altitude of the Zagros foothills in the northeast side of it. All this of course would also account for the rise in the level of the sub-soil ground-water all over the alluvial valley, and it would explain the difficulty which excavators have often found at sites in southern Iraq, in reaching the earliest levels of occupation without the use of a suction-pump.

Needless to say, it has not always been easy to reconcile this new explanation with the previously well-established archaeological evidence on the subject; with the geographical situation, for instance, of Eridu, home of Enki, 'God of the Deep', which is unequivocally described by the the Third Dynasty kings of Ur as being 'on the shore of the sea'; but is now separated from it by a hundred miles of desert. The picture of Ur, now fifteen miles from the Euphrates, as a harbour town with ships drawn up alongside its quays, is also difficult to explain. Nevertheless, the whole thing has aroused a new interest in the southern lake-district, which was previously supposed to have been submerged in Sumerian times: and as recently as 1961 an interesting article was published by Mr. G. Roux, reporting on sites newly discovered along the fringes of the great Hammar Lake.⁶ Some of these already had occupations in Sumerian times.

And now, if I may give one more example of what I have called 'auxilliary researches', which have recently added so much to our understanding of Mesopotamian archaeology, there is the primary economic problem of irrigation and the salinisation of the soil. The climatic regime in Iraq—little changed as our geologists now tell us since ancient times—and the seasonal fluctuations with which its earliest farmers were faced, are a commonplace on which it is hardly necessary for me to dwell. It can be summarised as—rain in inadequate quantities at the wrong time; river-water at a time when it was most needed, but concentrated in and around the river beds in an almost unmanageable superabundance for a comparatively short period. The diversion of the river water through the ages, and its distribution over areas of maximum utility, has produced the fantastic network of canals, whose ruins are today to be seen patterning the countryside. Historically, above all they bear witness to the most

⁵ H. E. Wright, Jr., 'Geological Aspects of the Archaeology of Iraq', *Sumer*, Vol. XI/2, 83–90, 1955.

⁶ G. Roux, 'Recently Discovered Ancient Sites in the Hammer Lake District (Southern Iraq)', *Sumer*, Vol. XVI, 20–31, 1960.

disastrous element in Mesopotamian agriculture: the salinisation of the soil and the consequent practice of what is called 'extensive cultivation'. Here again, in recent times there has been a great deal of officially sponsored research into the cause and effect of this dangerous phenomenon, and the possible means of remedying it; and in the course of this work it was natural that a good deal of attention should be paid to the historical aspect of the problem. When did the period of deterioration begin? How did it affect agriculture in Babylonian or even in Sumerian times? It is this line of enquiry which has once more produced a discovery, which can now at once be seen to be of major importance to the understanding of Mesopotamian history.

For, as a result of these researches, there is no longer any reasonable doubt that salinisation alone has been responsible for the gradual shift in the focus of Mesopotamian civilisation from south to north, which began with the growth of Assyria and was precipitated by the fall of Babylon in the sixth century B.C. I think that this theory was first evolved by Dr. Martin Beek, author of Collins' admirable *Atlas of Mesopotamia*⁷ in collaboration with Mr. P. Buringh, a soil specialist employed by the Iraq Government with whom he travelled while compiling the book. It is certainly crystallised with great clarity in R. O. Whyte's UNESCO publication *Land-use in Southwest Asia*. But here we must at once state that it owes its substantiation to one of the greatest Assyriologists of our time, Professor Jacobsen of Yale.

Jacobsen first began his researches in the subject in 1956. He found a succession of ancient texts which seemed to offer unmistakable evidence that salinisation was already a problem in Sumerian dynastic times. First there was a text of Urukagina's reign, in which it was stated that salt had made certain parts of the temple domain unusable for agriculture. Next there was a thirteenth-century boundary stone with an imprecation against anyone who should remove it, which said—'May Adad, the supreme director of irrigation, bring forth moist salt to destroy his fields and dry up the barley'. And next in time there is an Assyrian text from Ashur-bani-pal's library, with a story about Enlil's determination to destroy mankind by corrupting the soil with salt. And so it goes on, right up to Neo-Babylonian times, when there are texts having the same implication.

Having satisfied himself as to the meaning of these implications, Jacobsen then set about organising a general survey of agricultural records in cuneiform texts, combined with an actual survey of ancient irrigation and other remains in a particular district—the Diyala region, where large-scale Sumerian excavations have taken place.

⁷ M. A. Beek, *Atlas of Mesopotamia*, Nelson, London, 1962.

The texts which Jacobsen studied covered a period of 4000 years, from 2600 B.C. to 1400 A.D. They showed that soil deterioration was particularly serious at Lagash, where salinisation began in about 2400 B.C. and spread westward towards the Euphrates. A thousand years later it had reached as far as northern Babylonia. He was able to calculate that in 2400 B.C., wheat still accounted for 16% of the total crop. Three centuries later the proportion had dropped to 2%, and between 2000 and 1700 B.C. his reports contained no mention of wheat at all. Much more information of this sort gave substance to the picture of northward migration following impoverishment of the soil in the south. Yet it also became clear that this may only in part have been due to inefficient systems of cultivation; for there was evidence of remarkably up-to-date practices for extracting a maximum yield from the soil. A Sumerian agricultural manual of about 2100 B.C. even showed that attempts were made to counteract salinisation by a primitive fallow system and special methods of irrigation. Perhaps in the end these methods resulted in some sort of temporary recovery in agriculture, such as is suggested by Herodotus' description of the Babylonia harvest in the fifth century B.C.

Jacobsen's conclusions have so far only been published as a journal report.⁸ Anxiously awaited is his final account of the shift in wheat cultivation to the northern provinces. Meanwhile, we have another short report, on a similar survey made by R. M. Adams, of easily dated canals in the lower part of the bottle-neck between the two rivers.⁹ His maps give an extraordinarily vivid picture of the fluctuating use of various canal networks at successive historical periods.

Jacobsen's research in this problem of irrigation and salinisation was conducted by means of a field-survey, simultaneously with an exploration of relevant texts found during previous excavations. I want, before leaving the subject of Iraq, to refer to one other instance of this secondary yield of information, which results from the, necessarily delayed, publication of texts. For it has proved one of the most stimulating events in the recent progress of our general enquiry. Also it is reflected and enhanced by discoveries in Anatolia, to which I shall presently refer. Primarily then, it concerns the publications of the archives from the Palace of Zimri-lim at Mari.¹⁰ The appearance of the Mari texts has illuminated the life and history of a particular kingdom on the Middle Euphrates at the time of Hammurabi of Babylon. But it has gone much

⁸ Th. Jacobsen, 'Summary of Report by the Diyala Basin Archaeological Project, June 1, 1957 to June 1, 1958' *Sumer* Vol. XIV/1 and 2, 79-89, 1958.

⁹ S. A. Harris and R. M. Adams, 'A Note on Canal and Marsh Stratigraphy near Zubadiyah', *Sumer*, Vol. XIII/1 and 2, 157-163, 1957.

¹⁰ *Archives Royales de Mari*, Vols. I-IX, XV (published under the direction of A. Parrot and G. Dossin), Paris, 1950-1960.

further than this, in re-vitalising our studies of the north Mesopotamian regions in the centuries which followed. These texts have now merged with the Hurrian family archives from Nuzi; with Sir Leonard Woolley's evidence from Atchana; and, more remotely, with the volumes of newly published literature from Ugarit, to form a great and complex document, bearing upon the history and archaeology of the second millennium B.C. Suddenly, the second millennium is 'in the news'; and it has been striking to observe, at the recent meeting of Assyriologists, how many and from what widely different sources, contributions to the subject were offered.

Much of our new knowledge, of course, is embodied and summarised in Dr. Kupper's recently published contribution to the *Cambridge Ancient History*.¹¹ In a world which, as Dr. Kupper says, seemed until a few years ago to be occupied by Hammurabi in splendid isolation there now emerges, on the Middle Tigris, an embryo Assyrian empire; the personal creation of a hitherto obscure figure, Shamsi-Adad I. News of him comes from Mari, because already his rule could be extended across the Jasirah Desert to the Euphrates, and the Semetic ruler of Mari could be replaced by Shamsi-Adad's son, thereby assuring control of the trade-route from Babylon to north Syria. A second son was placed in a hitherto unidentified city at the junction of the Adheim river and the Tigris to watch the frontiers of Eshnunna; and we have the endearingly personal correspondence between these two young Assyrians and their father.

It was from Eshnunna that there came eventually the threat which unseated Shamsi-Adad. Zimri-lim returned from exile in Aleppo to regain his father's throne at Mari and the Mari texts resume the story of the indigenous dynasty. Dr. Kupper may devote a whole section to Mari itself; but others are needed to deal with its political neighbours; Eshnunna itself, Iamkhad and Qatna in north Syria, and the 'Great Kingship' of Aleppo. It is unlikely that any scholar would have attempted to deal historically with such subjects a decade ago. Then of course there are the Hurrians, already at this time infiltrating into north Iraq; not, in fact to be found at Mari itself, but at Nuzi and then at Chagar Bazar and finally in increasing numbers at Alalakh. From them the West Semites and Assyrians alike learn the secrets of horse-breeding and the use of a chariot with spoked wheels. One of these Shamsi-Adad's son is advised to ride in, to avoid the indignity of being seen mounted on a horse. And all through these records, like the subdued sound of traffic in the street, one's ear imagines the hum of commercial activity—the arrival and departure of caravans on trade-routes connecting the river-cities with surrounding countries. Because it was in Shamsi-Adad's time that Ashur had among other trading activities

¹¹ J. R. Kupper, 'Northern Mesopotamia and Syria', *Cambridge Ancient History*, Vol. II, chapter 1, Cambridge, 1963.

established its 'karums' or commercial colonies in remote Cappadocia. The Karum at Kanesh means Kültepe: and so, by easy stages our attention may now be diverted to Anatolia.

Here then, in the territory of the Turkish Republic, one is faced by what is unmistakably an archaeological renaissance,—a 'renewal of learning', as one was taught the meaning of the word at school. Superficially, one is impressed by the actual number of individual expeditions at work during the summer season, as well as the time-range which their work covers. But a closer acquaintance with them and a broader view of their results enables one to see how effectively they can be welded together into a solid pattern of improved archaeological enlightenment. In this respect, novel departures into the less familiar fields of enquiry have their own special significance, but even more important perhaps is the harvest of substantial evidence which is now beginning to be reaped from the long-range efforts of the old, established expeditions, which continue their work at the recognised centres of Anatolian culture; Kültepe for instance, now in its thirteenth campaign and Boghazköy in its nineteenth.

As a result of all this activity, in ten years the face of Anatolian archaeology has changed out of all recognition. Unlike Professor Mallowan's 1956 review of work in Iraq, my own, *Early Anatolia*¹² published in the same year, would now have to be almost completely re-written. And I think I may be allowed to say at once that a gratifying proportion of this change has been brought about by the widespread operations of our own Institute in Ankara. I refer of course to the immense programme of work which was contrived in collaboration with, and is now being brought to the most arresting conclusion, by Mr. James Mellaart.

I have spoken and written so much about this programme in the past, that this evening I propose to do no more than remind you of its salient points. I think that Dr. Kupper's phrase—'splendid isolation'—could in the early nineteen-fifties still have been applied jointly to the relics of the Hittite Empire at Boghazköy and to the people who were buried in the Early Bronze Age tombs at Alaca Hüyük. Certainly they then still occupied the centre of the archaeological stage at Anatolia. Save for the evidence from Troy and Kusura, Western Anatolia was an archaeological blank. Dim reflections of something known as the 'Copper Age' came from Alishar and Turkish excavations on the plateau, and the plateau itself was understood from negative evidence to have remained unoccupied by human settlers until the end of the fourth millennium B.C.

The speed and effectiveness with which this situation has been remedied in one decade is to say the least of it a matter for satisfaction. The discovery of a

¹² S. Lloyd, *Early Anatolia*, Penguin Books, London, 1956.

palace and public buildings at Beycesultan in the upper Meander valley, revealed the first non-Hittite centre of political life on the plateau during the Middle Bronze Age. A sounding at the same site created a vertical framework on which the chronology of West Anatolia could be constructed as far back as the Middle Chalcolithic period. And here there is a striking innovation in this form of research. For the vertical evidence of stratigraphy is now supplemented by astonishingly thorough horizontal documentation. This will be understood from the volume in which it is now published,¹³ where, side-by-side with the stratigraphy, the explorations of Mr. Mellaart and his assistants have enabled us to present a dozen distribution-maps, outlining the provinces and contemporary extent of each successive culture.

The settlement at Beycesultan was not founded until the early fourth millennium B.C. It remained for Mr. Mellaart, at his own site called Hacilar, near Burdur to carry the pre-history of the plateau back to Early Chalcolithic and Neolithic times.¹⁴ And now, as Dr. Mellink wrote in a recent archaeological summary, 'No prehistory of Anatolia or even of the near east will be written without a thorough study of the a-ceramic and ceramic levels at that site'. Nor was this all; for a gap in the Neolithic stratification at Hacilar led Mr. Mellaart to a prolongation of the same researches at Chatalhöyük in the Konya Plain;¹⁵ and of this we have been privileged to hear the results in a series of lectures by the excavator himself. Dr. Mellink's comments, in the summary of which I have spoken, on the first season's finds at the site, now seem like an ironical understatement. 'They show', she says, 'that the careful choice of a site was rewarded by discoveries which can hardly be called routine in Neolithic sites'! Indeed they can not.

While Mr. Mellaart continues his work in the great Neolithic township at Chatal, the evidence he finds is still being amplified by those who participated in the earlier surveys. Mr. David French finds a Chalcolithic village to the south-east,¹⁶ at the head of the Calychadnus Valley; brick houses with internal buttresses and wall-paintings, which link Hacilar and Chatal with the Cilician-Amuq and Mesopotamian cultures. Mr. Charles Burney in remote Azarbaijan re-discovers cultures of which he had become aware while surveying north-eastern Anatolia.¹⁷ With regard to the backward progress in time, Mr. Mellaart's exploration of the deepest layers at Chatal, have this year brought him to

¹³ S. Lloyd and J. Mellaart, *Beycesultan* Vol. I, 'Chalcolithic and Early Bronze Age levels', British Institute of Archaeology at Ankara Occasional Publications No. 6, London, 1962.

¹⁴ J. Mellaart, 'Excavations at Hacilar', *Anatolian Studies* Vol. VIII-XI, 1958-1961.

¹⁵ J. Mellaart, 'Excavations at Çatal Hüyük', *Anatolian Studies* Vol. XII-XIII, 1962-1963.

¹⁶ D. H. French, 'Excavations at Can Hasan', *Anatolian Studies* Vol. XII-XIII, 1962-1963.

¹⁷ C. A. Burney, 'Excavations at Yanik Tepe, Azerbaijan', *Iraq* XXIII, XXIV and XXVI, 1961, 1962 and 1964.

something not far removed from the Mesolithic and terminal Palaeolithic occupation recently recognised by Dr. Bostançi in an east Lycian cave at Beldibi.¹⁸

But I must return as I had promised to the Middle Bronze Age finds, which enhance our enlarged knowledge of the Second Millennium in Mesopotamia. The thread of Assyrian trade has brought us from Ashur to the *karum* at Kanesh in Cappadocia, by a route which has been ingeniously reconstructed from the texts by Professor Goetze.¹⁹ At Kültepe-Kanish itself, Professors Tahsin and Nimet Özguç have continued their patient work in the houses of the Assyrian merchants, with rich finds from graves and an aggregate of tablets which have resulted almost in *embarras de richesse* (fourteen hundred texts from a single house in the last season). But interest in the *karum* had, until recent years denied us any useful information about the merchants' relations with the native Anatolian princes, whose guests they were, and about the dynastic history of those princes themselves. This is now being remedied by Professor Özguç's excavations in the mound itself, which towers above the commercial suburb annexed to it. Here he has already uncovered a number of imposing public buildings and is able to analyse the stratigraphy in some detail. In a depth of eight metres he has three main Early Bronze Age levels, (corresponding, to our satisfaction, with our own arbitrary divisions of the Bronze Age at Beycesultan). It was in the third and latest of these that he discovered the white-painted megaron, with its four wooden columns and gigantic circular hearth to whose extraordinary significance I referred in my recent Reckitt lecture,²⁰ as being the thousand-year-old prototype of the Mycenaean palaces. On the mound, then, there next comes a 'Middle Bronze Age I' occupation, which corresponds to the foundation of the *karum* in about 1900 B.C. and there are levels corresponding to each of the occupations in the suburb (Karum III, II and Ib). It was here, in a public building at a level corresponding to Karum Ib that Özguç found the now famous bronze dagger, bearing the name of Anittas, the half-mythical fore-runner of the Hittite kings. Annitas' name, Professor Balkan tells us, has appeared again since, in tablets from the Karum itself, and also that of Warshama, king of Kanish, whose correspondence with a neighbouring Anatolian ruler he published.²¹

It was of course Anittas of Kussara who destroyed and cursed the old Middle Bronze capital of the Hatti kingdom of Boghazköy. And it is to buildings of this period in the Bogazköy town site that Professor Bittel has recently turned

¹⁸ E. Bostançi, *Belleten* No. 102, 233-292, 1962.

¹⁹ A. Goetze, 'An Old Babylonian itinerary', *Journal of Cuneiform Studies* VII, 51-72, 1953.

²⁰ S. Lloyd, 'Albert Reckitt Archaeological lecture', *Proceedings of the British Academy*, Vol. XLIX, Oxford University Press, London.

²¹ K. Balkan, *Letter of King Anum-herbi of Mama to King Warsharna of Kanish*, Ankara, 1957.

his attention from the great fortress of the Büyükkale above. Here he has found unmistakable traces of another *karum*, like that at Kanish. Nor was this all, for, in a Late Bronze Age house at the same site, he found tablets dating from the final years of the Hittite Empire, whose chronological and military details dovetail admirably with texts from Ugarit, to explain the role of Alasiya-Cyprus in the battles against the Sea Peoples.²²

Other Turkish colleagues have contributed to this rising total of information about the Second Millennium B.C.; Professor Sedat Alp at Karahüyük near Konya, with his impressive collection of Middle Bronze stamp- and cylinder-seals, (some of the latter unparalleled examples of the so-called 'First' and 'Second Syrian Styles'. Professor Alkim with his new site called Tilmen Hüyük in the great valley which runs up into Anatolia north of Aleppo²³; there, as we were told at the meeting of Assyriologists, he has a palace which matches in time and architecture Sir Leonard Woolley's Palace of Yarimlim at Alalakh. This catalogue could easily be prolonged. But let us now leave the Second Millennium, in order finally to consider the Anatolian Iron Age; for here a completely new page is turned, and we find ourselves face-to-face with expanding possibilities in a field which may rival in magnitude that of Assyrian archaeology.

In this Iron Age horizon, it is with something near to relief that our interest is now deflected from the small cities of the Hittite Diaspora, with their tangled history and hybrid art—preoccupations of an earlier generation of archaeologists. In our own time we have seen with satisfaction the discovery of a bilingual inscription at Karatepe and the decipherment of what were once called 'Hittite hieroglyphs'. But we have also seen the sculptures that went with it and we have tactfully professed to detect a sort of savage nobility in the unfailing bad taste with which their style is adapted from those of Assyria and even from contemporary Egypt. So now it is a relief to turn to the relics of a contemporary kingdom which stood head and shoulders above such poor relations. I mean of course Urartu.

Today it is at last being realised that the high accomplishment and far-reaching significance of Urartian culture has been consistently under-rated, largely because, to use a phrase of Dr. Mellink's, its remains have for so long lingered in a state of insufficient exploration. This is a nation—and in its time a very great nation—whose history and even its identity seem to have been completely expunged from the records of human memory for something like two-and-a-half thousand years. A century ago its name was almost unknown; yet to-day,

²² M. J. Mellink, 'Archaeology in Asia Minor' (A summary of Professor Bittel's finds at Boghazköy), *American Journal of Archaeology*, Vol. 67, 176-177, 1963.

²³ U. B. Alkim, 'Tilmen Hüyük Çalışmaları 1958-1960', *Belleten* XXVI, 447-499, 1962.

everything about it, its racial characteristics, political and economic history and its art, constitute one of the most intriguing problems in Near Eastern archaeology. Its rediscovery in the mid-nineteenth century we owe to the increasing interest at that time in epigraphic research and to the acumen of a few European scholars. Urartian inscriptions were located, recognised and translated soon after the Mesopotamian cuneiform; and the combined evidence of both transformed the life-story of a hitherto enigmatic people into the stock-in-trade of what was then called antiquarian research.

But what is important in the present context is that our knowledge of Urartu did remain purely historical. From the time that the details of its history had been studied, the whole subject seems to have got itself pigeon-holed, like a dead language, in the near-mythology of academic erudition, having no further connection with reality. This was partly due to political circumstances. We had now satisfactorily identified on the map the country which had once been the polity of the Urartian kings, and archaeological explorers had even identified its capital city. But beyond that our knowledge of its geographical character, its modern economy and the condition of its monuments, depended entirely on the testimony of half-a-dozen early travellers, whose observations were both untrained and un-imaginative. And so things were destined to remain for another half century. It was not easy to travel in those parts during the final years of the Ottoman Empire: and an even more rigid embargo has been laid by the new Turkish Republic on travellers in its eastern provinces. As a result knowledge of the physical background of Urartian history still depended, up to a few years ago largely on the observations of H. F. B. Lynch, published in 1901.²⁴

And yet—to-day it is difficult to understand how even circumstances such as these could have repressed interest in a land of such intrinsic interest, in which through two millennia of history such stirring events have taken place. Look for a moment only at its geographical extent and natural assets. It includes three enormous lakes; Van, Urmia and Sevan all lying at an average of 4500 feet above sea-level. (Two of these are heavily charged with minerals, but Sevan is sweet and full of fish). Most of the country in Urartian times was heavily forested and rich in timber for building. It was also and still is, rich in mineral ores—silver, copper and iron. The grazing capacity of its valleys was almost unlimited and large herds of horses were bred around Lake Urmia. All the normal cereals grew in abundance. As to the Urartian population, we know from the texts that in the three principal provinces seven hundred and fifty towns could be listed. We also know that successive kings built vast irrigation canals and reservoirs to increase the country's fertility.

²⁴ H. F. B. Lynch, *Armenia, Travels and Studies*, London, 1901.

Even before the present explorations began, it was possible to understand from the texts and from the appearance of this huge geographical area on the map, that it would be absurd to regard it as an obscure and insignificant vassal of the Assyrian Empire. It was in fact, though for a shorter period of time—larger, richer and every bit as technically accomplished as Assyria itself, and it is today really only by chance that it is less well known to posterity. New discoveries and an improved knowledge of their country now at least leave no room for thinking of the Urartians as second-rate Assyrians. And now one sees, primarily reflected in their art, in the architecture of their cities and their engineering works, a response to their surroundings which made them a great people in their own right. In architecture particularly they had transformed the Mesopotamian tradition of building—(square, flat labyrinths of mud brick in the dusty plain), by adapting it to the alpine landscape of their elevated mountain world with its high passes, lakes and fast-flowing rivers. In their cities as they are now beginning to be revealed, one recognises an almost ‘Arthurian’ atmosphere, of terraced and turreted castles and fortresses, connected by roads over which troops of well-mounted horsemen rode among villages artificially supplied with water.

But to return to the more sober facts of archaeology; where Frankfort writing only a decade ago could dismiss the subject with the words—‘The material culture of Urartu was largely under Assyrian influence’,²⁵ in 1962, his countrywoman Dr. Mellink begins to take a different view. ‘The sites of Altintepe and Toprakkale,’ she says, ‘are confirming that, in major and minor arts Urartu achieved originality and excellence. The fine ashlar masonry and the plans of its temples are unlike those of Assyria.’ ‘Wall-paintings and sculptures’, she admits, ‘also have underlying forms which are different and there are signs of a culture, developed away from the river valleys’. But each year brings new surprises. They started with Piotrovski’s excavation of the citadel at Karmir Blur, near Erivan and continued with Mr. Charles Burney’s commendable survey of similar ruins all over the Van area.²⁶ This started what one might almost call a ‘gold-rush’ by Turkish archaeologists to the Urartian field. And now there are three separate expeditions, all contributing newly revealed finds. There were Özguç’s stone-cut tombs of Urartian princes in the walled citadel at Altintepe near Erzincan,²⁷ with their richly novel examples of Urartian metalwork. Here and at Patnos, nearer to Lake Van,²⁸ there are comparable temples with curious unfamiliar plans and, in one case a peripteral

²⁵ H. Frankfort, *Art and Architecture of the Ancient Orient*, p. 102, London, 1954.

²⁶ C. A. Burney, ‘Urartian Fortresses and Towns in the Van Region’, *Anatolian Studies* VII, 37–54, 1957.

²⁷ T. Ozgüç, ‘Excavations at Altin Tepe’, *Belleten* XXV, 269–290, 1961.

²⁸ See K. Balkan in *Anatolia* V (1960), 99 ff. Further reports on Anzavur (Patnos) and Altin Tepe will shortly be published in the same journal.

colonnade. At the former site also there is a columned assembly hall, like an Achaemenian 'apadana', which combines with other evidence to suggest a source for some major art-forms of classical times in Persia. There are the first wall-paintings at Patnos, Altintepe and Arin Berd, sculpture at Adilcevaz—and everywhere the fine bronzes whose excellence created a demand for them as far afield as Etruria. The prospects offered by Urartian archaeology do indeed loom largely on the Anatolian landscape at the present time.

And now, time and a personal disability prevent me from going further and mentioning the recent discoveries at classical sites in what used to be called Asia Minor. Having, unfortunately, as was I believe said of Shakespeare, 'little Latin and less Greek', I must I think confine myself to the second floor of this establishment, and leave the classics to those who enjoy the amenities of the '*piani nobili*'.

Early Pottery Sites from Western Anatolia

by D. H. FRENCH

'Kulturtrift'¹ (the gradual spread of cultural influence) from the Near East into south eastern Europe has been and still is a popular theory. It is the object of this article to suggest that in western Anatolia at least, the present evidence for this theory is neither substantial nor complete and that much more evidence of all kinds must be gathered together from all regions before the theory can be accepted.

The survey published here was originally made with the intention of finding early material near the Aegean coast. The aim was to learn whether or not connections could be found between the early pottery cultures of Anatolia, e.g. Hacilar, and those of Thessaly, e.g. Sesklo.

TOPOGRAPHY (Fig. 1)

The survey was carried out by Landrover in the autumn of 1959² and the summer of 1960 and covered the lower stretches of the rivers Gediz and Büyük Menderes. The material collected was mostly pottery but one site, Morali, produced stone axes and worked flint and obsidian (Fig. 2).³ The sites are all mounds and with two exceptions, Karakurt and Nuriye, are built up on alluvial plain. Water is close at hand in all but one case. As at Hacilar, the neighbouring hills and mountains consist mostly of limestones. Forest (conifer) is still thick near one site, Ulucak; in the alluvial plain below Halitpaşa a few small oaks still survive. The region of Akhisar and Manisa, i.e. the lower Gediz, is geographically defined by mountains to the north, west and south and to the east by the volcanic area around Kula.

The sites visited were:

1. *Alibeyli, Manisa*⁴; visited 17/X/59. Mound in plain; ca 80 by 6m.; ca 6 km. north-east of Halitpaşa and ca 4 km. north-north-west of Alibeyli village; no visible water.

¹ 'Kulturtrift aus Vorderasien': see Schachermeyr, *Die Ältesten Kulturen Griechenlands* (Stuttgart, 1955), 52 etc.

² This work was undertaken when I was Joint Scholar of the British Institute of Archaeology in Ankara in 1959-60.

³ The material is now in the British Institute of Archaeology at Ankara. Nothing on the stone industries of Hacilar and of the Sesklo period in Thessaly has yet been published. In the meantime, the use of flint and chert in addition to obsidian is worth noting.

⁴ There is also Late Chalcolithic of Kumtepe Ib type from Alibeyli: see *A.S.* XI (1961), 102f and map, Fig. 2.

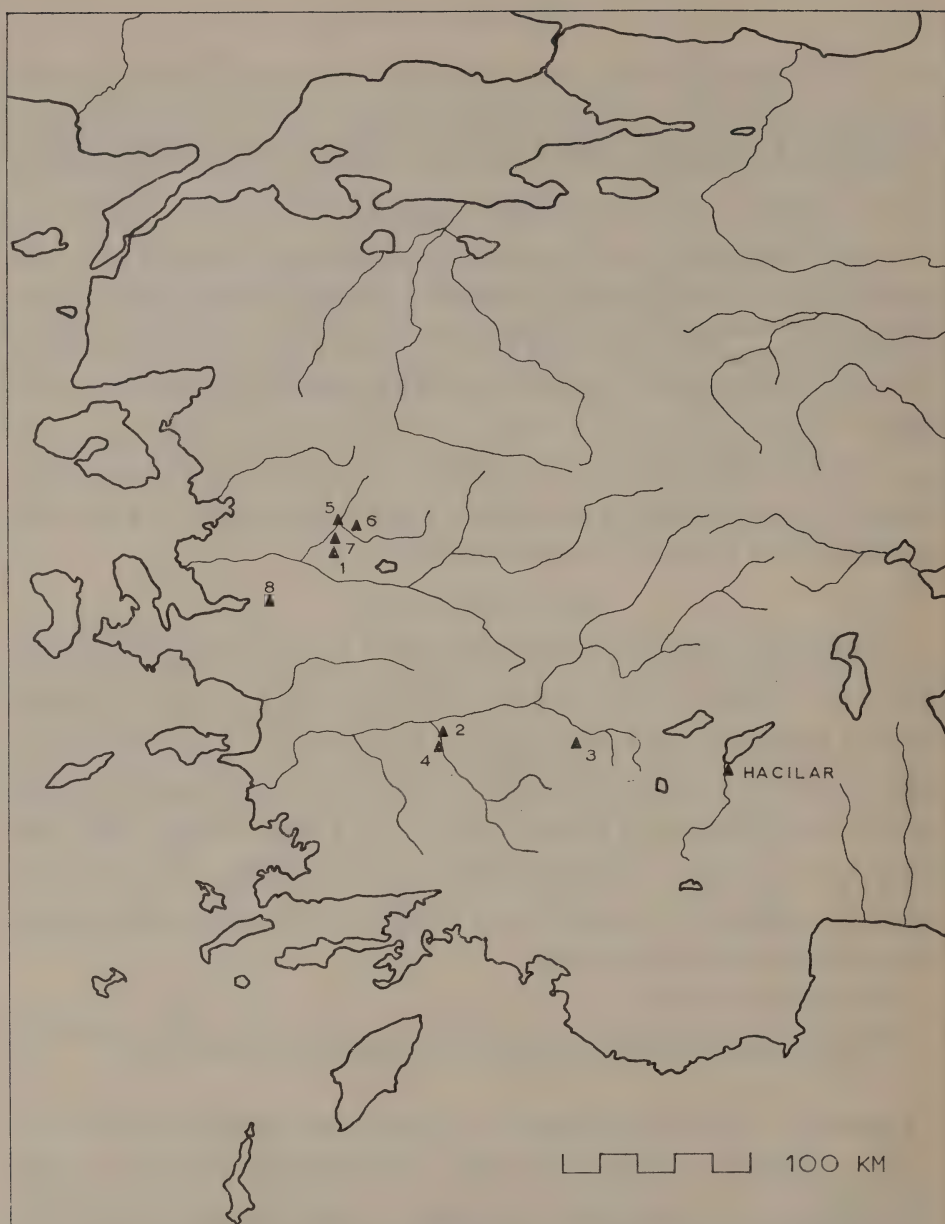


FIGURE 1
Map of Western Anatolia with sites mentioned in the text.

EARLY POTTERY SITES FROM WESTERN ANATOLIA

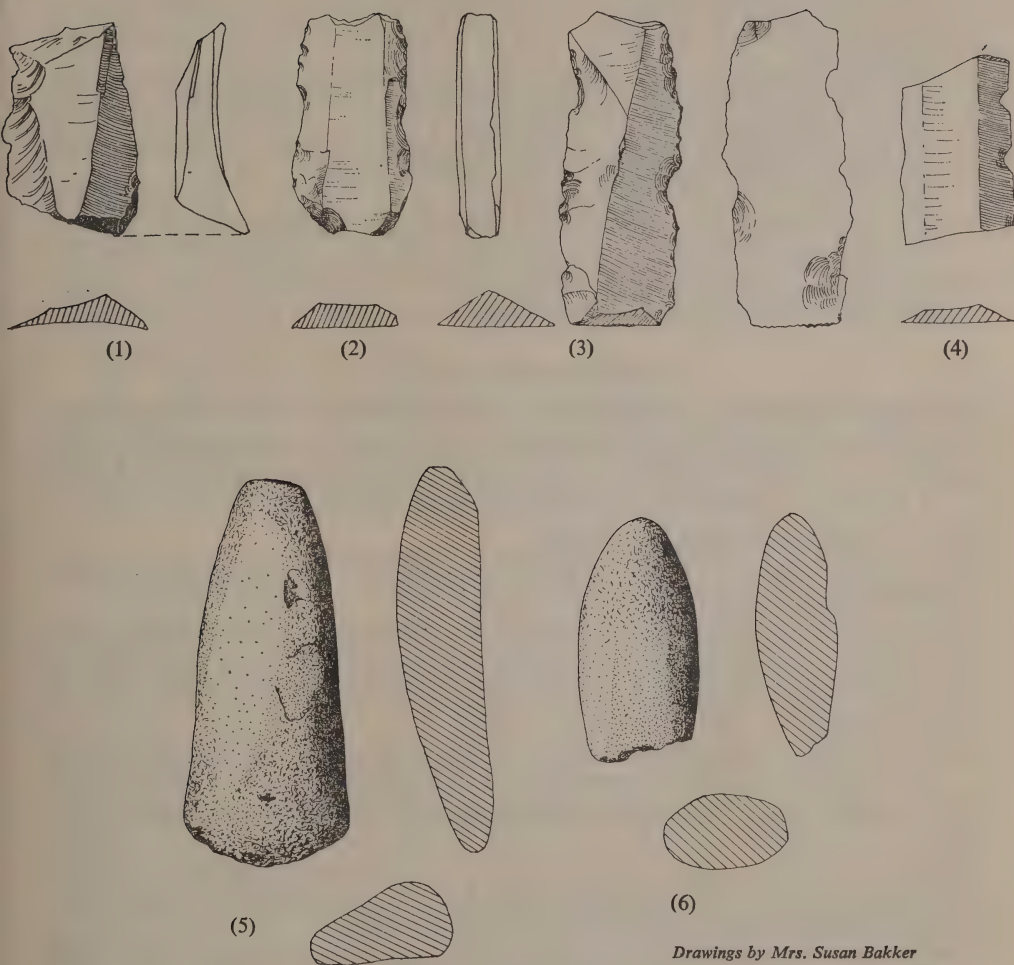


FIGURE 2

Stone objects from Morali (nos. 1-2 obsidian; no. 3 flint; no. 4 chert).

Scale: nos. 1-4 1:1; nos. 5-6 1:2

2. *Hamidiye, Nazilli*⁵; visited 24/VII/60. Mound in a small alluvial plain; *ca* 90 by 5m.; *ca* $\frac{1}{2}$ km. due east of village and just to south of road linking village with main road; *ca* 1 km. east of river; streams nearby; not within area of Menderes flooding.
3. *Karakurt, Denizli*⁶; visited 26/VII/60. Site on the east and south sides of a rock outcrop; *ca* $\frac{3}{4}$ km. south of village; in valley; village lies *ca* 4 km. east-south-east of Denizli; stream at foot of rock.
4. *Kavaklikahve*⁷; visited 24/VII/60. Mound on the edge of sloping ground but above flood plain of river; *ca* 80 by 5m.; immediately to north of the 'kahve' and just beside and to the east of the road between Nazilli and Bozdogan; close to river.
5. *Kayışlar*⁸; visited 25/X/59. Mound on the edge of a ridge; *ca* 100 by 6m.; *ca* 300m. north-east of village; stream on east side; on west side, overlooks marshes.
6. *Morali, Akhisar*⁹; visited 22/X/59. Mound in plain; *ca* 150 by 3m.; *ca* 1 km. south-west of village and *ca* 3 km. west of Kennez; no visible water but probably on edge of old lake.
7. *Nuriye, Manisa*¹⁰; visited 19/X/59. Site on low rock bluff; *ca* 2 km. south-east of village; mill and bridge *ca* 200m. to north; surrounded on three sides by small river.
8. *Ulucak, Kemalpaşa*¹¹; visited 22/X/60. Mound in plain; *ca* 90 by 5m.; 1 km. south of village and *ca* 400m. north of main road and small river.

POTTERY (Figs. 3-5)

The total number of sherds from all eight sites is about 100, of which about 70 are from Morali and about 20 from Ulucak. All profile pieces are illustrated. At Karakurt and Kayışlar, only sherds without profile were found.

A number of superficial observations can be made:

- (1) All sherds have mica in the clay.
- (2) All sherds have straw tempering to some degree. This shows occasionally even on outer surfaces.
- (3) Cores are usually black between red, even on sherds with red and orange blotching on the surface (Fig. 5:10) and on sherds with a very fine red burnished surface (Fig. 3:7 and 5:13). A rough count gives about 75% of the total.
- (4) Surfaces have been given a colour wash or slip which was then burnished. The thickness of the application varies greatly. Grey or black outer surfaces are very rare: red is the predominant colour. Grey or black inner

⁵ Site shown on map: Mellaart *A.S. XII* (1962), 43, Fig. 1. For the Late Chalcolithic see *A.S. XI* (1961), 102f and map, Fig. 1; also Lloyd and Mellaart, *Beyce Sultan I*, 165, 243, n.2, and map I (p. 70). For the Bronze Age see map IV (p. 138), map VI (p. 196) and map VIII (p. 252).

⁶ See map; Mellaart *A.S. XII* (1962), 43, Fig. 1. For the Late Chalcolithic see Lloyd and Mellaart, *Beyce Sultan I*, map I (p. 70); for the Bronze Age see map VI (p. 196).

⁷ Site shown on map: Mellaart *A.S. XII* (1962), 43, Fig. 1. For the Bronze Age, see Lloyd and Mellaart, *Beyce Sultan I*, map VI (p. 196).

⁸ For the Late Chalcolithic, see *A.S. XI* (1961), 101ff and maps, Figs. 1 and 2; and also Lloyd and Mellaart, *Beyce Sultan I*, 106, 109 and 111f, map I (p. 70), and map II (p. 105).

⁹ Previous references: Lloyd and Mellaart, *Beyce Sultan I*, 111f; and *A.S. XII* (1962), 43, Fig. 1; and Schachermeyr *A.A.* 1962, 319; see also Mellaart *A.S. X* (1960), 90 and map, Fig. 2.

¹⁰ Previous reference: Mellaart *A.S. X* (1960), 90 and map, Fig. 2; and *A.S. XII* (1962), 43, Fig. 1.

¹¹ Site shown on map, Mellaart, *A.S. XII* (1962), 43, Fig. 1.

surfaces are occasionally found; there are three sherds from Morali (one, Fig. 5:2); one from Ulucak (Fig. 5:17) and one sherd from Karakurt (not drawn).

Some sherds can be isolated by their surface treatment. Of these (b) is typically Hacilar but (c) and (d) may be peculiar to the area around Manisa.

(a) White slip and burnish (Fig. 4:31); and another (not drawn) from Morali is red burnished inside, white slipped and burnished outside.

(b) Very fine red burnish (Fig. 3:7 and 5:13); others from Nuriye and Kayışlar.

(c) Red burnish with grey blotching (Fig. 3:9 and 21, and 4:16); perhaps also from Ulucak (Fig. 5:5).

(d) Pale red burnish with orange blotching (Figs. 4:9 and 5:10) two other sherds from Ulucak (not drawn) from a bowl and a jar, and two sherds from bowls (not drawn) from Morali.

(e) Buff burnished (Figs. 3:10, and 5:11 and 12).

Shapes are bowls and jars, with little variation. The small raised base (Fig. 4:22) is typically Hacilar, but ring bases (Fig. 4:30) are not. Bowls are rather straight sided, less curved than the typical Hacilar VI shape. There appears to be no oval shape. The flat rim (Fig. 4:7) is rare.

COMPARISONS WITH HACILAR POTTERY

The chronology of the pottery published here cannot easily be estimated. Firstly, the sherds do not necessarily form a homogeneous group. Secondly, to consider that even the greater part of this material is 'Hacilar', i.e., part of the 'Hacilar' culture and identical with pottery from Hacilar, is not possible. It may be possible, however, to form a working assumption that most of the sherds are contemporary with Hacilar IX-VI. Some sherds may be earlier (e.g. the flat rim, Fig. 4:7) or later than the bulk of the material.

Nevertheless, this pottery does not make it necessary to think that relations between the west coast and Hacilar were close. There are points both of similarity and of difference between the pottery described above and that of Hacilar.

The points of similarity are certain shapes (e.g. Fig. 5:9) and at least one type of surface treatment (Fig. 3:7; very fine red burnished). In general, but not exactly, the shapes repeat those of the earlier levels (IX-VI) at Hacilar. The points of difference are:

1. The use of straw temper which is not found at Hacilar.
2. Variations of surface treatment (in some cases perhaps deliberate) which are not found at Hacilar (Figs. 3:9 and 4:9).
3. The ring base (Fig. 4:28-30) which although occasionally found is not characteristic of Hacilar.

4. A flat rim (Figs. 3:1 and 4:7-8), a type which is not found at Hacilar, but which does occur (in a different fabric) at Çatal.
5. The pottery at Hacilar seems superficially to be finer.
6. Black interior surfaces seem commoner in the south west plateau region than in the Manisa area.

Such points must, however, be tested by an analysis of pottery fabrics and sections.

The one sherd of painted ware from Morali (Fig. 5:4) is too small to be used. It could belong to the Hacilar I type.

DISCUSSION

The two aims of the survey were: 1, to find early occupation in the river valleys leading from the western plateau down to the Aegean coast; and 2, to discover whether or not connections existed between western Anatolia and the Aegean area.

The first of these two aims has been accomplished. It is clear from the position of these sites (Fig. 1) that the Menderes and Gediz valleys were occupied, if only thinly, and that the routes along them between plateau and coast were probably known and used at least as early as Hacilar VI, i.e. by the second half of the sixth millennium B.C.

The second aim is not so easily fulfilled. One positive result is the discovery that there are differences between the pottery of Hacilar and that of Morali, for instance. Also there is the probable difference in the source of obsidian for Hacilar and for Morali. If the test presently being made on the Morali pieces can provide evidence of a different source, perhaps in the Aegean area, e.g. Melos or the Troad, then another distinction becomes clear.

On the basis of this evidence the following points may be raised: that the coastal area may be as much orientated towards the west, i.e. the Aegean, as towards the east, i.e. the plateau region of south west Anatolia; and that it may at the same time follow certain local lines of development and should not necessarily be included in the area of the 'Hacilar culture'.¹² Perhaps the west coast area may even be a centre of 'diffusion' not necessarily between east and west but also between west and east. Is it impossible for there to have been a 'Kulturtrift' in the opposite direction, towards Anatolia, or even more than one 'Kulturtrift' at more than one time?

At this stage much more research is necessary, particularly by scientific analysis of, for example, pottery clays, stone, bones, soil samples, pollen samples and so on. Analysis of such materials as these can give evidence which can then be used to compare the developments in agriculture, for instance, or the

¹² The 'Hacilar' culture awaits full and complete definition.

domestication of animals, in the three areas, south-west Anatolia, the west coast and the Aegean. Only excavation, however, can provide this material for study by specialists. When this material is to hand, the question of relations between Hacilar, the west coast and the Aegean will be better answered on all levels, not only on that of pottery. The words 'influence' and 'diffusion' cannot be used until they are better defined and until there is a greater body and variety of evidence from all three areas. The theory of 'Kulturtrift aus Vorderasien' can then be substantiated, modified or even abandoned.

CATALOGUE OF ILLUSTRATED POTTERY (Figs. 3-5)

Figure 3

ALIBEYLI

1. Jar. Grey burnished inside; red burnished outside. Rim diam. 0.20m.

HAMIDIYE

2. Bowl. Black burnished inside; red burnished outside. Rim diam. 0.12m.
3. Bowl. Black burnished inside; black topped red-brown burnished outside. Rim diam. 0.13m.
4. Jar. Red burnished. Rim diam. 0.14m.

KAVAKLIKAHVE

5. Jar. Red burnished. Rim diam. 0.12m.

MORALI

6. Bowl. Pale brown burnished. Rim diam. 0.26m.
7. Bowl. Fine red burnished. Rim diam. 0.16m.
8. Bowl. Red burnished. Rim diam. 0.20m.

9. Bowl. Red burnished, grey blotching. Rim diam. 0.20m.
10. Bowl. Buff burnished. Rim diam. 0.22m.
11. Bowl. Dark red burnished. Rim diam. 0.34m.
12. Bowl. Brown burnished. Rim. diam. 0.28m.
13. Bowl. Brown burnished. Rim diam. 0.28m.
14. Bowl. Red burnished. Rim diam. 0.10m.
15. Bowl. Red burnished. Rim diam. 0.22m.
16. Bowl. Red burnished. Rim diam. 0.22m.
17. Bowl. Red-brown burnished. Rim diam. 0.28m.
18. Bowl. Red burnished. Rim diam. 0.22m.
19. Bowl. Red burnished. Rim diam. 0.22m.
20. Bowl. Red burnished. Rim diam. 0.24m.
21. Jar. Red burnished, grey blotching. Rim diam. 0.23m.
22. Jar. Brown burnished. Rim diam. 0.20m.
23. Jar. Red burnished. Rim diam. 0.28m.

Figure 4

MORALI

1. Jar. Red burnished. Rim diam. 0.15m.
2. Jar. Red burnished. Rim diam. 0.20m.
3. Jar. Red burnished. Rim diam. 0.16m.
4. Jar. Red burnished. Rim diam. 0.35m.
5. Jar. Red burnished. Rim diam. 0.20m.
6. Jar. Red burnished. Rim diam. 0.24m.
7. Jar. Red burnished. Rim diam. 0.16m.
8. Jar. Buff burnished outside. Rim diam. ?
9. Bowl. Red burnished. Rim diam. 0.22m.
10. Bowl. Red burnished. Rim diam. 0.32m.
11. Bowl. Brown burnished. Rim diam. 0.22m.
12. Bowl. Red burnished. Rim diam. 0.46m.
13. Bowl. Brown burnished. Rim diam. ca 0.45m.
14. Bowl. Black burnished inside; black topped buff burnished outside. Rim diam. ?
15. Bowl. Red burnished. Rim diam. 0.28m.
16. Jar. Red burnished, grey along rim. Rim diam. 0.12m.
17. Jar. Red burnished. Rim diam. (estimated) 0.13m.
18. Jar. Red burnished. Rim diam. 0.12m.
19. Jar. Red burnished. Rim diam. 0.12m.

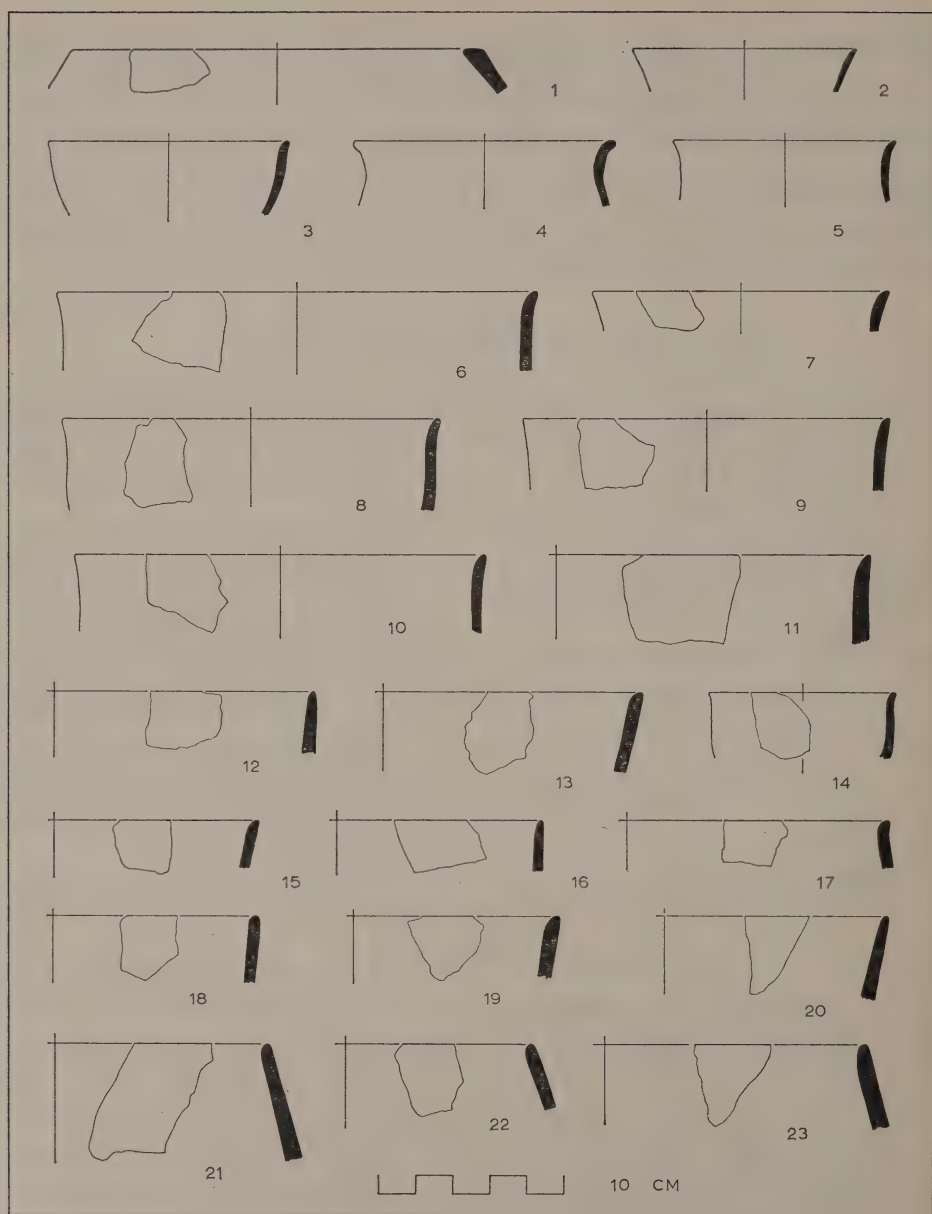


FIGURE 3

Pottery from Alibeyli (no. 1), Hamidiye (nos. 2-4), Kavaklikahve (no. 5), and Morali (nos. 6-23).

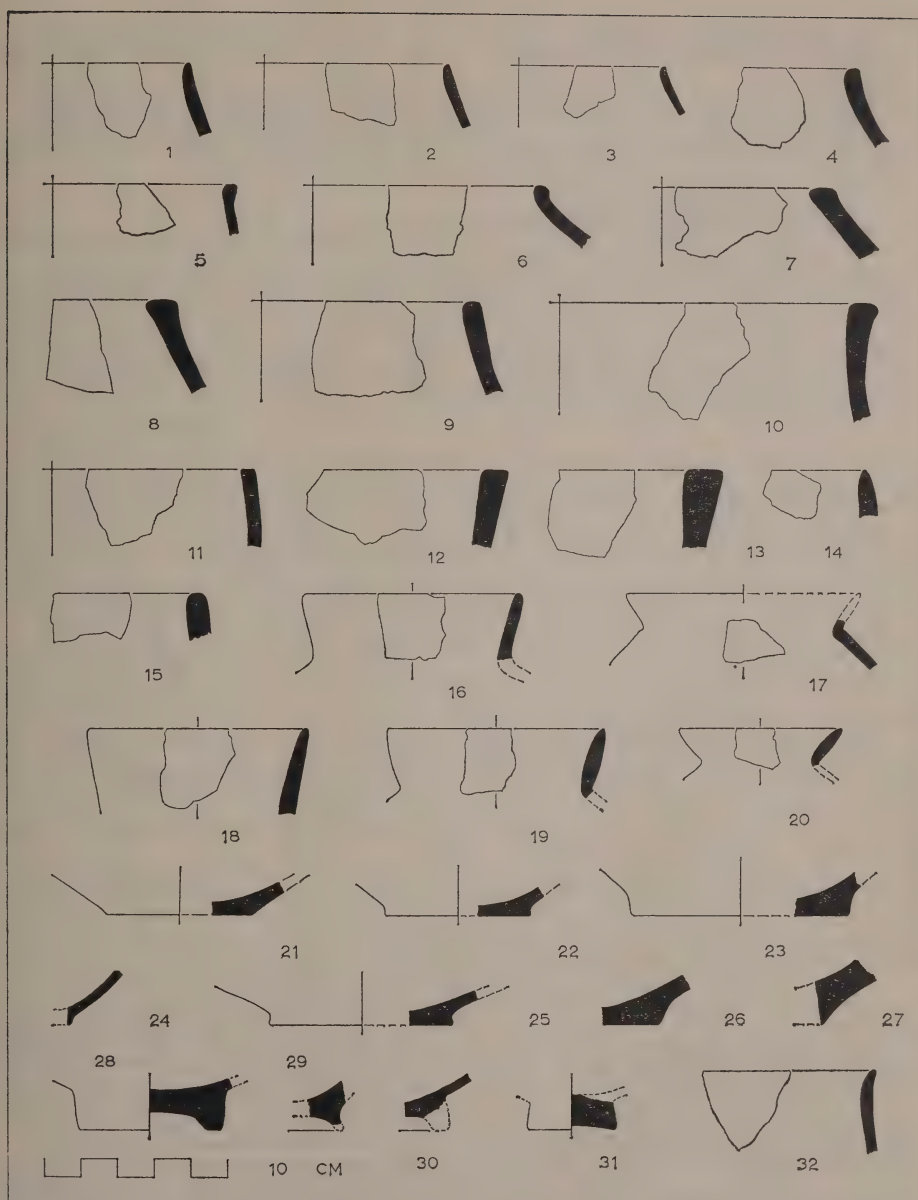


FIGURE 4
Pottery from Morali (nos. 1-31) and Nuriye (no. 32).

FIGURE 4

20. Jar. Red burnished. Rim diam. 0.09m.
21. Jar. Red burnished outside. Base diam. 0.08m.
22. Bowl. Brown burnished. Base diam. 0.08m.
23. Bowl. Brown burnished. Base diam. 0.12m.
24. Bowl. Red burnished. Base diam. ?
25. Jar. Brown burnished outside. Base diam. 0.10m.
26. Jar. Pale brown burnished. Base diam. ?
27. Bowl. Brown burnished. Base diam. ?
28. Bowl. Brown burnished. Base diam. 0.08m.
29. Bowl. Red burnished. Base diam. ?
30. Bowl. Red burnished. Base diam. ?
31. Bowl. White slipped and burnished. Base diam. 0.05m.
32. Bowl. Red burnished. Rim diam. 0.26m.

NURIYE

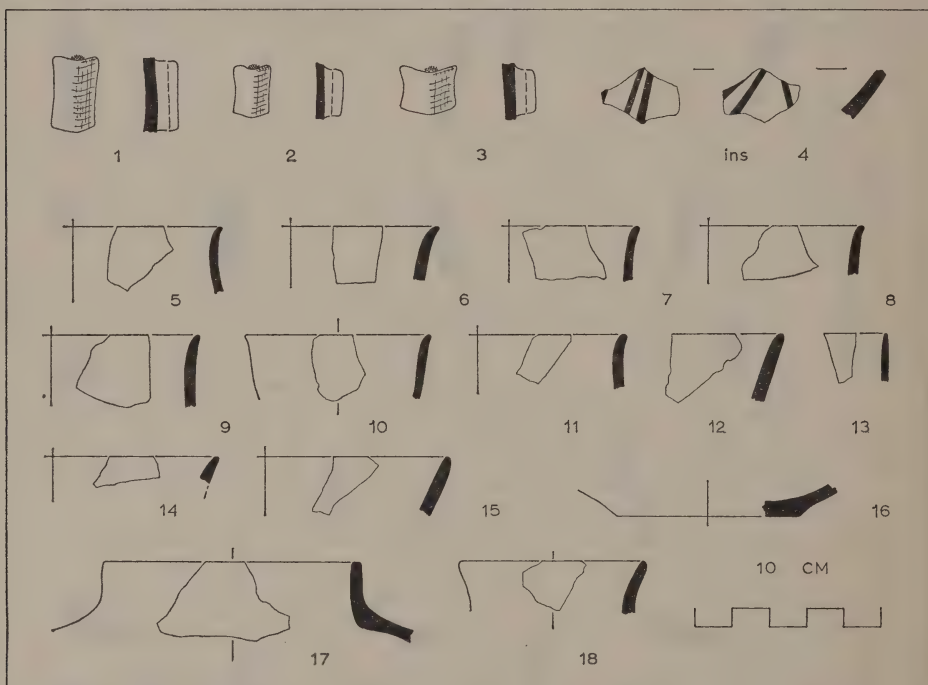


FIGURE 5 Pottery from Morali (nos. 1-4) and Ulucak (nos. 5-18).

MORALI

1. Bowl. Brown-red burnished.
2. Bowl. Black burnished inside; pale brown burnished outside.
3. Jar. Red burnished outside.
4. Bowl. Red paint on cream ground; all over burnished.

ULUCAK

5. Bowl. Red burnished. Rim diam. 0.16m.
6. Bowl? Brown-red burnished. Rim diam. 0.16m.
7. Bowl? Red burnished. Rim diam. 0.14m.

8. Bowl. Red burnished. Rim diam. 0.17m.
9. Bowl. Red burnished. Rim diam. 0.16m.
10. Bowl. Red burnished. Rim diam. 0.10m.
11. Bowl. Buff burnished. Rim diam. 0.16m.
12. Bowl. Buff burnished. Rim diam. ?
13. Bowl. Red burnished. Rim diam. ?
14. Bowl. Red burnished. Rim diam. 0.20m.
15. Bowl. Red burnished. Rim diam. 0.20m.
16. Bowl. Red burnished. Base diam. 0.10m.
17. Jar. Red burnished. Rim diam. 0.14m.
18. Jar. Red burnished inside; black burnished outside. Rim diam. 0.10m.

Spectrographic Analysis of some Romano-British Mortaria

by K. F. HARTLEY and E. E. RICHARDS

It has long been appreciated by archaeologists that an objective means of distinguishing pottery from different kilns would be a considerable help in dealing with site-finds. The definition of distribution patterns is obviously of major importance in considering the economics of the pottery industry, and close dating of pottery, certainly mortaria, often depends upon knowing the area of manufacture.

In 1958 the first-named writer, then beginning a general survey of Romano-British mortaria, approached the Research Laboratory for Archaeology at the University of Oxford about the possibilities of spectrographic analysis. A programme of work was agreed and analysis of some 50 samples was initially undertaken by the second writer. This involved examining the concentrations of various minor elements which might reflect variations in the clay used.¹

The initial object was to determine first the range of variation in mortaria made at the same kiln-site or by the same potter, and secondly the degree of variation which might be expected between products of different potteries. The results proved encouraging and so the investigation was extended, much of the work being concentrated on the mortaria from known kilns, most of them with potters' stamps.² More than 270 samples have now been analysed. Samples from mortaria definitely made in each kiln-centre provide the Reference

¹ The oxides of sodium, magnesium, manganese, titanium and calcium. The method used for the spectroscopy is described in *Nature* 185, No. 4707 (Jan. 16, 1960), 194-6, and *Archaeometry* 2, 23.

The averages given in the present paper differ in some cases from those given in the preliminary report. This discrepancy is due in part to changes in the membership of and additions to the Reference Standards, and in part to improvements in the calibrations as additional chemically analysed materials have become available from the U.S. Bureau of Standards.

² We are grateful to Drs. E. T. Hall and M. J. Aitken, the Director and Deputy Director of the Research Laboratory for Archaeology in the University of Oxford, for their encouragement and support which made the project possible; and to Mrs. A. Blin-Stoyle of the Laboratory who compiled the results.

We acknowledge with thanks the help and co-operation of those museums which provided samples or allowed them to be taken. These included: the Ashmolean Museum; the British Museum; the University Museum of Archaeology and Ethnology, Cambridge; the Royal Museum, Canterbury; Tullie House Museum, Carlisle; the Colchester and Essex Museum; Corstopitum Museum; Doncaster Museum; the Hunterian Museum of Glasgow University; Ipswich Museum; the Museum Service of the Ancient Monuments Branch of the Ministry of Works; the National Museum of Antiquities of Scotland; the National Museum of Wales; Norwich Museum; Peterborough Museum; Salisbury Museum; Verulamium Museum and Warrington Museum. Thanks are also due to Professor Eric Birley, F.S.A., Professor S. S. Frere, F.S.A., Mr. B. R. Hartley, F.S.A., Mrs. R. Hemsley, Dr. J. Houghton, Dr. M. G. Jarrett, Mr. Frank Jenkins, F.S.A., Miss K. M. Richardson, F.S.A., Dr. Graham Webster, F.S.A., and to all who have provided samples not yet analysed or published.

Standards against which probable products may be checked. The average concentrations obtained for six elements have been represented in graph form for quick comparison (Figs. 1-3). Even if the values vary between the ranges given for each element, the general appearance of the diagram remains very similar. The figures are given in detail in the tables.³

When a decision has to be made on the possible origin of a sherd, using the results of the spectrographic analysis, it is not only the concentrations of the chosen elements averaged over the Reference Standards, which have to be considered, but also the expected extent of the fluctuations about this average due to the intrinsic inhomogeneity of the raw materials from which the pottery was made. As data for more kilns accumulated it was found that a range extending from 30% above to 30% below the average for each element would include the large majority of samples within each Reference group (see column 'n' in the Tables). Subsequent application of statistical methods to other, larger, groups of pottery has shown that the odds are four to one against sherds of common origin having compositions outside this range.

Records were, of course, kept of the mortaria from which samples had been taken, so that archaeological evidence could be used as a check on the success of the spectrographic results. Wherever possible, samples were taken from mortaria found on kiln-sites, but in some instances, which are noted below, it was sufficient, or necessary, to take them from other products of the potters in question. Where the kilns have not yet been located, the general areas in which they lie may frequently be deduced from the type of fabric and trituration grit, the rim-shapes, the distribution of mortaria stamped by a given potter, or from incidentals, such as similarities in the design and decorative frame of stamps. None of these factors taken alone is necessarily a conclusive indication; some are subjective but, if all agree, the region in which the kilns are to be found is virtually certain. We have, therefore, added to the located kilns some groups of stamped mortaria whose area of manufacture has been inferred in this way, and these too are noted in the relevant sections below.

Once the Reference Standards for excavated kilns had been established, a number of mortaria presenting problems that spectrographic analysis might illuminate were subjected to the process. For the most part these consisted either of work by potters whose likely centres could be limited on the archaeological evidence, or mortaria by potters like G. ATTIVS MARINVS, who used several distinct fabrics and might, therefore, be suspected of having moved from one centre to another.

The results for individual factories and kilns and for the broader regions are discussed in the following sections. It will be sufficient here to note the

³ Presentation of the results in graph form was suggested, and the graphs drawn, by Mrs. A. Blin-Stoyle.

SPECTROGRAPHIC ANALYSIS OF SOME ROMANO-BRITISH MORTARIA

general regional traits—the relatively high calcium concentration in all examples from East Anglia and Kent, the relatively high magnesium in the north-western groups, and the relatively high titanium in Lincolnshire. Extreme distinction was, however, found to be exceptional and, in general, one must consider the combined pattern for each kiln-centre and compare it with the results for each other group. The graphs greatly facilitate such comparisons.

NORTH-WEST ENGLAND

Carlisle Region

AVSTINVS

Hard, red-brown fabric with cream slip.

AVSTINVS was assigned to the north-west by E. Birley and J. P. Gillam (*Arch. Aeliana*, 4th Series, XXVI, 175, no. 4) and the distribution of his stamps points to an origin in the Carlisle area.

Wilderspool, Cheshire

Unstamped wasters

Hard, orange or red-brown fabric with cream slip.

Kilns were found by Thomas May at Stockton Heath, part of the Wilderspool industrial site, at the beginning of this century. The published records do not give full details of the pottery, though May believed that mortaria were made there.⁴ The presence of distorted and misfired wasters in the Wilderspool collection at Warrington Museum bears this out. The distorted wasters are included in the Reference Standards. One of the mortaria stamped by DECMITIVS is also warped, and is unlikely to have been marketable.⁵ Consideration of their distribution makes the assignment of DECMITIVS, the maker of 126/127, BRICO, the maker of 129, and DIS/LDB to Wilderspool virtually certain. The stamps of BRICO, C.C.M., JANIACO, AME (135), and the trademark of 133 and 97 are on mortaria of the same form and fabric.

These assigned mortaria fit the Wilderspool Reference Standards very well, but the analysis shows that there could be confusion with AVSTINVS. It is this possibility that prevents DOCILIS III (136, 193 and 194) from being placed at one or other of the two centres. His Hadrianic-Antonine date and distribution-record would accord with production at Wilderspool, though only one stamp has been noted there. On the other hand, some of his forms seem to suggest a link with AVSTINVS, whose distribution does not accord with kilns at Wilderspool.

An interesting problem is raised by 191 (May and Hope, *Catalogue of the Roman Pottery in the Museum, Tullie House, Carlisle*, pl. XVII, no. 7), stamped by Die A of SIMILIS. He used this die on undoubted midland mortaria, but the fabric of the Carlisle piece is red-brown with a cream slip, and not the normal buff or white fabric of the midland potters. While visual examination already suggested the possibility of a change of kiln-site, it is most interesting to find that the spectrographic pattern fits the Carlisle Region results and differs markedly from all known midland groups. Unfortunately only this single example is known in the aberrant fabric.

⁴ T. May, *Warrington's Roman Remains*, 60; *Trans. Hist. Soc. of Lancs. and Cheshire* 52, 26; 56, 28 for brief notes on the kilns and pottery.

⁵ At first sight, distorted mortaria seem surprisingly rare at kilns. The fact is that shrinkage cracks usually developed radially, because of the thick fabric, and mortaria tended to break into comparatively small pieces in which distortion can rarely be detected.

The graphs in Figs. 1, 2 and 3 display the variations in average concentrations of the different elements. The averages are those shown in the table, using the reference groups only, except that the Mn concentrations have always been multiplied by 10 to make a more compact picture.

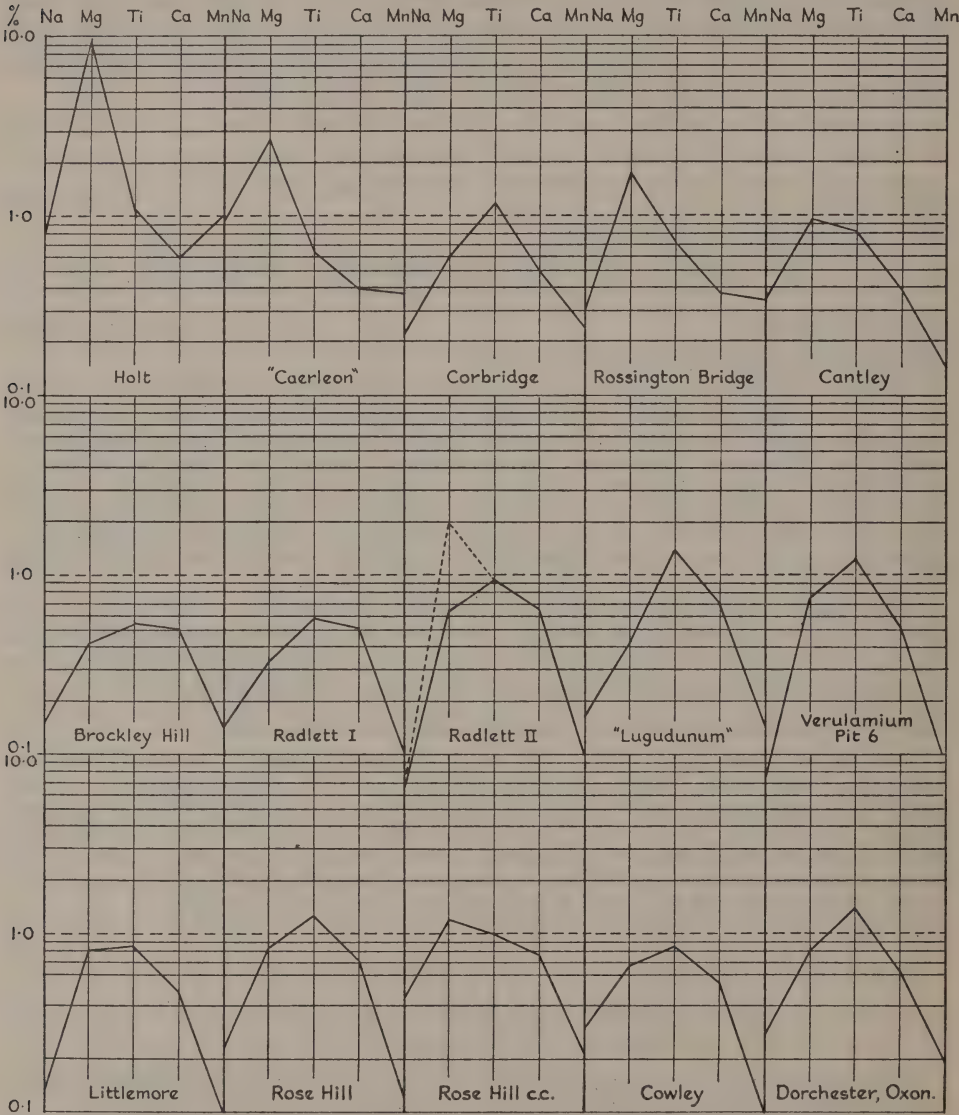


FIGURE 1

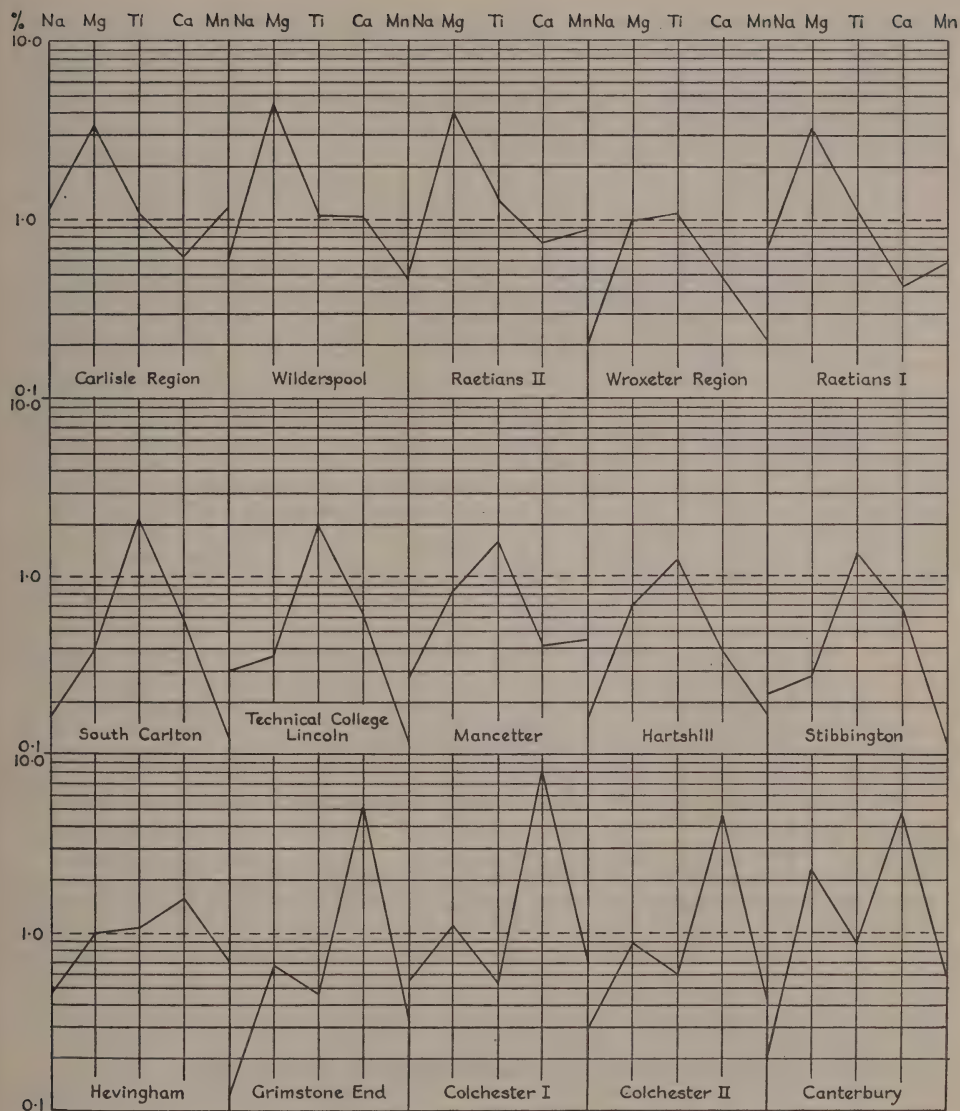


FIGURE 2

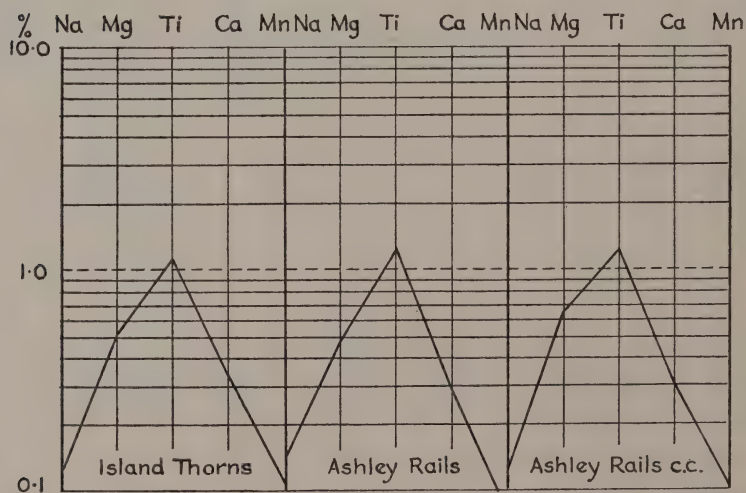
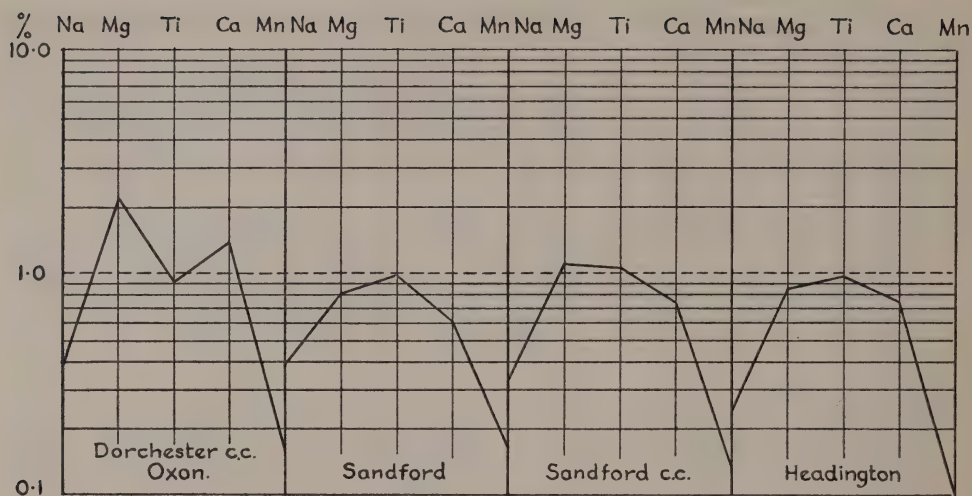


FIGURE 3

'Raetian' II^a

Orange-brown fabric with red-brown slip.

The samples were selected from at least fifty-seven found by May at Wilderspool.⁷ There are no distorted wasters, but some of the pieces appear to have been misfired. The type is not normally found in such quantity and this, together with slight differences in form and fabric from the 'Raetian' I group (see West Midlands) suggests a different factory. Analysis showed marked similarity to the Wilderspool group, the calcium in particular is higher than in most potteries outside East Anglia and Kent. It is here also that they differ significantly from the 'Raetian' I vessels. In view of the general reliability of the calcium index, the attribution of this group to Wilderspool is not unreasonable.

WEST MIDLANDS AND WALES

Wroxeter Region

Cream or buff fabric, more rarely pinkish: often gritty in texture.

The location of the kilns is in this instance inferred from the distribution of the stamps:

DOCILIS: Chester; Heronbridge; Kinderton (Middlewich); Wall Town; Wroxeter (18); Brecon Gaer; Caerau Brecknockshire; Caerhun (3); Caersws and Castell Collen.

DECANIVS: Alcester; Chester (2); Shapwick, Dorset; Wilderspool; Worcester; Wroxeter (28); Brecon Gaer (3) and Penydarren Park.

The samples in this group were deliberately selected to give the widest selection of fabrics possible in order to check the extremes for each potter's products. Despite this, they make a consistent group, though unfortunately they could, on the analysis alone, be confused with other sources, such as the Warwickshire region or the Doncaster sites.

Samples 92-95 are by the other potters believed to have worked in the same general area. Nos. 92 and 93 fit well, and the style of their stamps links them with DOCILIS II and DECANIVS, rather than with MELVS II (94) and DOCILIS I (95). Although the evidence of distribution, fabric and forms all proclaim a west midland origin for 94 and 95, they differ from the Reference Standard and from each other spectroscopically. The analysis therefore suggests the possibility of other kilns in the area.

'Raetian' I

Orange or brown fabric with red slip.

These examples are from a collection of more than a hundred 'Raetian' mortaria now at Wroxeter, some allegedly found in a kiln.⁸ Whatever the truth of the matter, their concentration at Wroxeter and their rarity elsewhere suggest local origin. Indeed, some of the fragments appear to be misfired. Analysis, however, shows a strong difference from the other west midland pieces in sodium, magnesium and manganese, so they evidently come from another factory nearby.

*Holt, Denbighshire*Unstamped mortaria⁹

All three vessels have the orange or red-brown fabric typical of Holt mortaria. The analysis gives consistent results, notable for the high magnesium content and differing in this from all other groups investigated. This offers a potential means of checking a long-standing problem. Pottery very like Holt products from both military and civilian contexts in the Chester neighbourhood and Wales, is usually assigned to Holt. It should now be possible to check this.

* For a description of the characteristics of the type see *Arch. Aeliana*, 4th ser., XXVI, 194. While there are remarkable similarities to some mortaria from Raetia and Upper Germany, there is now no doubt that the type was also made in the West Midlands and at Wilderspool, and perhaps elsewhere in Britain.

⁷ Twenty-two of these have standard Raetian profiles. The other thirty-five are more normal flanged types, but have identical fabric and slip. As they were clearly made by the same firm, they have been classed together for purposes of spectroscopy.

⁸ There is a verbal tradition that Raetian mortaria were found some years ago in association with a kiln immediately outside the Roman town at Wroxeter. There does not, however, appear to be a record of this discovery, the alleged site now offers no surface indication, and extensive trenching of the field a few years ago added no further information.

⁹ W. F. Grimes, *Y Cymmrodor*, XLI, Fig. 61, Nos. 6 and 7 are the types from which the samples were taken.

'Caerleon'

Mortaria in red-brown fabric with red slip found at Caerleon have commonly been accepted as legionary ware and assumed to have been made near Caerleon (cf, for instance, *Arch. LXXVIII*, p. 178). They often have potters' stamps, but these give only letter series from which no kind of sense can be wrung.¹⁰ Such stamps do not inspire confidence in a legionary origin. Nor have the kilns been discovered, though as the mortaria were only distributed in quantity in south Wales, and to a lesser extent in the Marches (Kenchester, Wroxeter and Caerwent providing evidence of civilian use) and south-west England, they are to be sought in south Wales or the southern Marches.

Sample 78 is especially notable, because though it is a normal example of the series, it was found at Bar Hill on the Antonine Wall, where the presence of a vexillation of Legio II Augusta is recorded (Macdonald, *The Roman Wall in Scotland* (2nd edn.), 403, no. 23).

NORTH-EAST ENGLAND

Corbridge

SATV(RNINVS) III¹¹

Slightly sandy, cream fabric, sometimes with pink core.

A mortarium die of SATVRNINVS has been found at Corbridge (*Report on the Excavations in 1911*, p. 58 of the offprint, Fig. 14), but his kilns do not appear to have been discovered. The two samples analysed are not enough, considering the wide difference in the results, to give a reliable average or range and further analysis is required.

Satisfactory work on north-eastern products is made difficult by the lack of excavated kilns. The comparative material in this section is by potters who should have worked in the north-east, to judge by the evidence of distribution. The variations in the results for them suggest that a complex situation has yet to be unravelled.

The mortaria stamped SVLLONAC (36-38) require special notice. It has been suggested that the stamp related to the SVLLONACAE of the Antonine Itinerary, identified with Brockley Hill (*Arch. Aeliana*, 4th series, XXVI, 191, no. 55). This is not the place to review the whole of the evidence, and it will perhaps be enough to say that the distribution is confined to the vicinity of Hadrian's Wall. The spectrographic results contrast considerably with those for Brockley Hill, but have points of resemblance to those for ANAVS, BELLICVS and CVDRE (19, 39-42), though not enough to demonstrate a connexion.

Doncaster area

SARRVS,¹² SETIBOGIVS, VBRN and unstamped exx.

Orange or red-brown fabric, sometimes with grey core: cream or buff slip.

Two extensive potteries have been discovered in recent years, at Rossington Bridge (*J.R.S.* L, 220) and Cantley (*Yorks A.J.* XXXVIII, 403, XXXIX, 1). Analysis shows some divergence between them, presumably because different clay pits were used. It is, however, clear from the comparative material, all (except 96) from the two sites, that it will not always be easy to distinguish their products. As the Reference Standards are based almost entirely on the work of the two main potters, SARRVS and VBRN, it is likely that the range is too narrow. As more material accumulates, it should be possible to check this.

The most useful point to emerge is that the Doncaster material is spectrographically distinct from north-western products which can easily be confused with it visually.

Lincoln area

South Carlton¹³

VOROLAS, CRICO

Hard, cream fabric.

¹⁰ *Arch. Cambrensis* 1932, Fig. 68 for examples of some of the stamps. The samples are from mortaria with stamps like Nash-Williams' Nos. 11 and 22, and one with the stamp AVHR, retrograde.

¹¹ *Arch. Aeliana*, 4th ser., XXVI, 190, under SATVRNINVS II.

¹² SARRVS began his career in the midlands, probably at Hartshill (p. 33), and later worked at Rossington Bridge, where he used one of the same dies (D).

¹³ *Ant. J.* XXIV, 129ff.

Technical College kiln, Lincoln¹⁴
Sandy, greyish cream fabric.

VITALIS I

Samples were taken from mortaria found at Corbridge and Newstead, because of their availability, but the results were so clear and uniform that it was unnecessary to check material from the kilns. The fabrics used at the two sites can be distinguished by eye, but they appear identical in analysis. The markedly high titanium content, however, makes them quite distinct from all other kiln-groups examined, though the Nene Valley values approach them.

33 (AESICO) was found with kiln-debris on a site in north-west Lincolnshire, the precise position of which was not recorded. It is useful to find that analysis gives a very close parallel with the Lincoln kilns.

84 (CRICO), from Rough Castle, was selected because its fabric was slightly darker and coarser than usual. Analysis revealed an unusually high percentage of manganese, but otherwise it has the normal South Carlton range. It should be noted that manganese can be present as nodules of pyrolusite, and the inclusion of one of these in the sample would account for the divergence.

THE MIDLANDS

*Warwickshire Region*¹⁵

Hard, white or cream fabric is normal.

Mancetter

SENNIVS (3), MAVRVS (3) and two illiterate potters

One kiln has recently been excavated, and others are known to exist (*Trans. Birmingham A.S.* 77, 5ff).

Hartshill

VITALIS IV,¹⁶ MINOMELVS (2)

Four kilns were excavated in the last century (*Proc. Soc. Ant. Lond.* 2nd series, XVI, 404), but the pottery has almost all disappeared. Eighteen kilns were excavated by the first writer in 1960 and fourteen more in 1961. This work makes it clear that this part of Warwickshire was the centre of an industry working at factory scale and supplying mortaria to the midlands and to northern military sites from the early-second to the mid-fourth century.

Many of the mortaria from this region could be confused in fabric with some from Lincolnshire, the Nene Valley, and, to a lesser extent, Colchester and the West Midlands. There is enough difference in analysis, however, for useful determination of most doubtful examples.

Twenty stamps of GRATINVS from Hartshill show that he worked there, but 150 is a single example from the Mancetter kiln. On the whole, the evidence suggests that this is a stray from Hartshill, but the sites are so close that it would have been possible for some potters to have had kilns at both.¹⁷

G. ATTIVS MARINVS is now known to have worked at Hartshill for part of his career: 90, from High Cross, fits the Hartshill pattern well.¹⁸

SARRVS has long been assigned to Hartshill by Professor Birley (K. M. Kenyon, *Excavations at the Jewry Wall, Leicester*, 219, no. 15). This attribution of his products in pipeclay fabric was necessarily based on inconclusive evidence (*Proc. Soc. Ant. Lond.* 2nd series, XVI, 404ff; *V.C.H. Warwickshire* I, 246). It is now clearly supported by the analyses for 16 and 18.

¹⁴ *J.R.S.* XXVII, 233.

¹⁵ The term 'Warwickshire Region' has been used for simplicity. As Mancetter is on the border of Warwickshire and Leicestershire, some of the kilns may be within the Leicestershire boundary.

¹⁶ No. 261, from a mortarium stamped by VITALIS IV found at Hartshill, exhibits the same kind of anomaly in manganese as No. 84 (see under South Carlton).

¹⁷ For GRATINVS see also Nene Valley, p. 34.

¹⁸ P. 34, under Verulamium Region, and the comparative material for Colchester Group I, p. 36, for comments on his work at other potteries.

The Nene Valley

Stibbington

Unstamped mortaria

Hard, cream or buff fabric.

The spectrographic pattern is straightforward and would be easy to isolate from all tested groups except, perhaps, some from the Lincoln area. So far the Stibbington kilns are the only ones known to have produced mortaria in the Valley. There must in fact have been many more, and the present Reference Standard may be unduly restricted. Analysis of colour-coated ware from other kilns in the Valley shows that a greater range of clays was in use.¹⁹

There is slight archaeological evidence hinting that SIMILIS (88) and GRATINVS (Warwickshire Region 151) may conceivably have worked in the Nene Valley for a time. Analysis of these two samples showed close similarity with the Stibbington pattern for SIMILIS only. Results for the other sample fit somewhat better with the Hartshill Reference Standards, and it would be rash to assume evidence of migration.

SOUTH-EAST ENGLAND

Verulamium Region

Sandy fabric varying in colour from greyish cream to pale orange-brown.

Group A Brockley Hill

MATVGENVS I (4), MELVS I

Group B Radlett I

CASTVS (3), G. ATTIVS MARINVS

Group C Radlett II

DRICCIVS (2), MICTVS (2)

Group D 'Lugdunum'

ALBINVS (3), RIPANVS TIBER F.

Q. RVTILIVS RIPANVS

Group E Verulamium Pit 6

ROA (2), illegible stamps (3)

The term 'Verulamium Region' is here used to include not only the known kiln-sites within a few miles of Verulamium, such as Radlett (*Proc. Soc. Ant. Lond.* 2nd series, XVII, 261ff) and Brockley Hill (*Trans. London and Middlesex A.S.*, new series, X, 1, 201; XI, 173; XVIII, 62; XIX, 65), which are both within a few miles of Verulamium, but also other kilns believed to exist near Watling Street in the stretch between Verulamium and London. In the Flavian-Trajanic period mortaria were supplied to the furthestmost parts of the Province, while London and Verulamium were naturally major markets as long as production continued. The recorded kilns can only account for a tiny fraction of the output.

It has been possible to isolate five groups tentatively. Groups A and B are from kiln-sites, while C and E are from pits apparently associated with pottery manufacture. Group D consists of mortaria by potters using counter-stamps including the abbreviated place-name LVGVDV. There is now ample evidence demonstrating that these potters, who used to be assigned to a continental Lugdunum, worked in the Verulamium Region, though the precise site remains unknown.²⁰

The composition of the Radlett I Group calls for special comment. Only about half of the stamps found in 1898 at the kilns can now be located. Among them are two, one on a waster, of G. ATTIVS MARINVS, who seems to be the potter described as illiterate (*Proc. Soc. Ant. Lond.*, 2nd series, XVII, 266): one of them is included in the Reference Group.²¹

There is some variation in the internal results for the five groups. Group D, surprisingly, is the best, while the wares of the two potters involved in Group C show marked differences in their magnesium contents. There are many similarities between the groups, and while it is possible to recognize normal products of the Region from analysis, it would be impossible to assign them with certainty to the individual groups. It is likely enough that some of the potters worked at more than one of the factories.

¹⁹ *Archaeometry* 3, p. 25ff.

²⁰ The evidence is unpublished and requires fuller treatment than is possible here.

²¹ The significance of the higher calcium content of sample 59 is not yet clear, but compare also Colchester Group I, p. 35.

SPECTROGRAPHIC ANALYSIS OF SOME ROMANO-BRITISH MORTARIA

East Anglia and Kent

All analysed mortaria made in East Anglia and Kent show a much higher calcium content than other regions. At Hevingham, however, the content is lower than usual (below 2%). Mortaria from the kilns at Grimstone End, Colchester Group II and at Canterbury vary from about 3% to 7% calcium, and it is not possible to distinguish between them on analysis, but Colchester Group I is characterised by an extremely high calcium value—5% to 11%.

Hevingham, Norfolk

INGENVS, ESAMVS and an illiterate potter²²

Buff fabric, sometimes with a core of different colour.

The samples are from excavated kilns and are misfired to such abnormal colour and texture that they must be regarded as wasters. The paucity of mortaria suggests, however, that the kilns producing them have yet to be discovered. The ESAMVS mortarium is an old find from another kiln on the same site. It varies in sodium, magnesium and titanium contents from the other two samples, though the calcium contents are close enough. It would be worth analysing future finds to secure a more reliable definition of the range.

The three comparative samples are from mortaria by potters who may be assigned to East Anglia. Their notably higher calcium content makes them unlikely candidates for Hevingham and the evidence suggests that the kilns have yet to be found.

Grimstone End, Suffolk

Unstamped

Sandy, greyish cream fabric.

The samples are from kilns recently excavated by the staff of Ipswich Museum. The fabric and crudeness of technique clearly indicate a genuine group and one of them is a vitrified waster. Analysis corroborates the grouping.

Colchester

Group I SEVERVS (2), SEX. VALERIVS SAT[, SEX. VALERIVS IV[, SEX. VALERIVS, VALERIVS SATVRN[.²³

Hard, cream or pinkish fabric.

Group II MARTINVS, DVBITATVS, REGALIS, TITVS, MESSOR, CVNOPECTVS and 4 herringbone trademarks.

Yellowish cream fabric, more rarely pink.

Group I consists of mortaria by potters assigned to this area on indirect evidence. One by SEVERVS is so distorted that it can only have been found at the kiln, though unfortunately its precise provenance is not recorded. His stamps are limited to Colchester, while those of the SEXTI VALERII are concentrated there and comparatively rare elsewhere. Analysis shows no noticeable difference between their work and that of SEVERVS, though this does not necessarily mean that they worked together. SEX. VALERIVS [(61 and 217) may be connected with the Colchester Valerii, but his stamps are much rarer at Colchester than at London and in Kent. The fabric is also different from typical Colchester ones and is reddish with cream slip. His two mortaria analysed (from Colchester and Richborough) both gave results widely different from Colchester Group I, though still suggestive of kilns in Essex or Kent.

A few mortaria by SEX. VALERIVS IV[from sites distant from Colchester look like products of the Verulamium Region.²⁴ One from Ebchester was analysed (218) with results widely different from Colchester Group I. Its high manganese may be anomalous (cf 84, South Carlton, above): if so, the results could imply origin near Verulamium, though the analysis is not in fact conclusive. A Colchester origin seems definitely to be excluded.

Distribution, fabrics and forms suggested that C. HERME(S) and CRICIRO I belonged to the Colchester area. It is highly satisfactory to have supporting spectrographic evidence (236 and 214). Similar archaeological evidence applied to normal products of APRILIS (215 and 216) and

²² J.R.S. L., 228.

²³ Several *cognomina* are recorded on stamps from Colchester with the *praenomen* Sextus and the *nomen* Valerius. They appear to belong to a contemporary group of potters.

²⁴ P. 41, under Verulamium Region, No. 218.

again analysis adds confirmation. But one of his mortaria from London (229) gave such contrasting results that a Colchester origin seems doubtful.²⁵ Interestingly enough, the fabric had been noted as abnormal before analysis, though no great significance had been attached to the fact. Its source remains in doubt, though there are similarities with the Verulamium Region results.

Similarly, mortaria by a rare potter who stamped TMH show two distinct fabrics. On the basis of the fabrics and distribution, a provisional attribution to the Verulamium and Colchester groups was made. Spectroscopy strongly supported these (223, Verulamium Region and 222, Colchester Group D).

The results for G. ATTIVS MARINVS are so outstanding that they demand special treatment. Visual examination shows three varieties of fabric: A. slightly sandy cream, sometimes with pink core; B. sandy pink; C. hard white or cream, a smooth finish. B is associated with kilns at Radlett (p. 34), Fabric C with a kiln at Hartshill. Fabric A occurs with a few stamps from a larger die. As four mortaria in Fabric A had been found at Colchester (a most improbable market for a Hartshill potter) the possibility of origin in East Anglia had to be considered. Two examples from Colchester were analysed (219 and 221) and the results fit Colchester Group I so closely that origin in this area may now be taken as established. The combined archaeological and scientific evidence leads to the conclusion that G. ATTIVS MARINVS produced mortaria in at least three widely separated places—the Colchester area, Radlett and Hartshill.

The work of G. ATTIVS MARINVS and TMH shows undoubted migration between the Colchester area and the Verulamium region, and in the light of this, it seems reasonable to accept provisionally the distinct indication of migration noted for APRILIS and SEX. VALERIVS IV[. This is, indeed, what one would expect in the Flavian-Trajanic period, since the potters of the Verulamium region clearly enjoyed wider potential markets.

Group II

The Reference Standards are from the kilns excavated by Mr. M. R. Hull in 1933, with a few others stamped by the same potters and in the same fabric but found elsewhere. The comparative material includes mortaria from sites on or near the Antonine Wall which have similar stamps and fabric. Most of the latter have suffered from chemical weathering in the soil; often the pieces were too friable to permit adequate rubbings of the stamps to be made (much of the samian from the same sites is also poorly preserved). Most of the 'herringbone' stamps from the Antonine Wall could be matched exactly with ones found at the Colchester kilns (164 is an example). Others, from the Wall, including 163, are associated with stamps recorded from southern sites, but not yet from Colchester. Samples 201 and 65 are also associated with such stamps, but these samples are from Kent and Corbridge. The one name-stamp, MESSOR (66), is from Camelon; 15 of his stamps, though not from this die, were found at the Colchester kilns. All the mortaria in the comparative group closely resemble the mortaria from the kilns in fabric and rim-shape.

It is noticeable that 67, 201 and 65 (from Worthing, Kent and Corbridge) have a normal Colchester calcium content. All the others, except 163 (Old Kilpatrick) have a lower calcium content than is normal. This is presumably related to the soil conditions: acid soil, coupled with leaching of the fabric, may well account for the removal of calcium salts. The exception to this general rule (163) is a mortarium that shows no sign of disintegration of the fabric. It is clearly desirable that future samples from pottery likely to have a high calcium content should be taken from unweathered sherds.

Canterbury

Unstamped (3); 1 trademark

Fine-textured drab cream fabric.

The Reference Samples are from a kiln excavated by Mr. F. Jenkins in 1959 (*J.R.S.* L, 236), and are apparently products of it. Visually, the fabric is indistinguishable from Colchester mortaria, but the spectrographic results show a divergence in magnesium content.

²⁵ P. 41, Verulamium Region, No. 229.

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In the comparative samples are three of six vessels associated with another Canterbury kiln (*Arch. Cant.* LIII, 109ff), stamped with three different dies. The excavator was uncertain whether they were made at the kiln. Although it is clearly impossible to assign them to Canterbury by spectroscopy alone, the fact that the stamps are rare, have a purely Kentish distribution, and are at least associated with a local kiln, makes such an origin probable.

SOUTHERN ENGLAND

Examination of mortaria from kilns in the Thames Valley and the New Forest and their products on habitation sites strongly suggested that the similarity of forms and decorative techniques had led to confusion. In fact it appeared that their relative importance as centres of mortarium manufacture in the third and fourth centuries had been inverted and that the Oxfordshire series was by far the more important. With practice the mortaria can be distinguished visually, but, as it was clear that there had been confusion, it was hoped that the spectrographic work would offer useful objective evidence. This was found to be so.

The Thames Valley

VOSSVLLVS (2), trademarks (5), unstamped (11)²⁶

i. Cream, sometimes greyish, fabric with slightly sandy texture and often a pink or grey core. Occasionally the fabric is pink or orange; a cream slip is common.

ii. Orange fabric, sometimes with grey core, and a red-brown colour-coat.

The spectroscopic results are based on nine groups, three colour-coated, from six potteries (Littlemore, Rose Hill, Cowley, Dorchester, Sandford and Headington) all within nine miles of Oxford. Distinction between their products by eye is rarely possible and analysis revealed the similarity in composition which might have been expected, though the relatively high calcium content of the colour-coated ware from Dorchester is notable. There are similarities in composition with the Verulamium region, but the sodium and magnesium values for the two areas usually differ enough for distinction to be made.

New Forest

Unstamped²⁷

i. Hard off-white or greyish fabric.

ii. Pinkish buff fabric with chocolate-brown colour-coat.

Three groups, one colour-coated, from the kilns at Island Thorns and Ashley Rails were analysed. All showed a virtually uniform distribution of minor constituents, and were clearly distinguishable from the analysed Thames Valley specimens.

CONCLUSIONS

This investigation has demonstrated that reliable ranges for the concentration of certain constituents can be given for potteries by spectro-chemical analysis. Since there was a large quantity of material, we were forced to limit ourselves to small groups of samples for some regions. For the most part these seem to show the likely variations adequately, but where there is much divergence in samples, as with the two Corbridge Reference Standards, extra work is obviously called for. It may also be useful to deal in more detail with sites where kilns of different date are being excavated, as at Doncaster or Hartshill. For

²⁶ *Oxoniensia* I, 81; VI, 9; XVII/XVIII, 224, for kilns at Dorchester, Rose Hill, Cowley and Headington; *Archaeologia* LXXII, 225 for Sandford.

²⁷ Heywood Sumner, *Excavations in the New Forest Roman Pottery Sites*. Samples were taken from Nos. 12, 20 and 21 on Pl. XXXII (Island Thorns), and Nos. 16, 17, 19 and 25 on Pl. XXXIII (Ashley Rails). The samples of colour-coated mortaria were from sherds found recently on the kiln-site at Ashley Rails.

example, it should be possible to investigate the apparent differences between the majority of Rossington Bridge products and the majority of Cantley products and to determine whether the sources of clay remained the same in different periods.

There appeared always to be sufficient differentiation for an *average* product of any major pottery to be recognized. However, borderline cases occur and it must be stressed that the Reference Standards do not necessarily give the fullest possible range for each pottery. A given set of results cannot, therefore, be taken as proof that the potter involved definitely worked at a known pottery with the same pattern, though they may strongly suggest it. They do, however, provide a truly objective factor which can be used effectively in conjunction with archaeological evidence. The latter alone may be slight, but if it agrees with a clear set of spectroscopic results, the indications become very strong. For instance, where migration of a potter has been postulated, there have always been such agreements, though the archaeological information varied from the very slight to the very considerable. Spectroscopy, then, is invaluable in studying problems of migration. Several other potters, such as SIMILIS (p. 34) require examination in this way.

It is also hoped to extend the investigation, as opportunity offers, by setting up reliable standards for newly excavated kilns, and by studying the distribution of the products of different potteries. For instance, many mortaria of uncertain origin have been found in Wales. Some are probably from Holt or Wilderspool. The products of these factories are not always to be distinguished by eye, and it would be especially interesting to learn the extent of the market of the Wilderspool potters in Wales.

While the method is now of proved value as an aid in investigating Romano-British mortaria, it is of course not necessarily limited to these vessels. The extension of the work to other classes of pottery has begun at the Oxford Laboratory, and results will slowly accumulate.²⁸

²⁸ *Archaeometry* 3, 25ff.

SPECTROGRAPHIC ANALYSIS OF SOME ROMANO-BRITISH MORTARIA

TABLES OF SPECTROGRAPHIC ANALYSIS OF SOME BRITISH MORTARIA*

NORTH-WEST ENGLAND

S	Kiln area or Potter's name	N	%Na ₂ O	n	%MgO	n	%MnO	n	%TiO ₂	n	%CaO	n	Remarks
<i>Carlisle Region</i>													
	Average	3	1.15		3.4		.119		1.10		.63		
	Range		.80-1.50	3	2.4-4.4	3	.08-.16	3	.77-1.43	3	.44-.82	3	AVSTINVS (3)
<i>Wilderspool</i>													
	Average	5	.58		4.5		.047		1.05		1.06		
	Range		.41-.75	4	3.1-5.9	5	.033-.061	3	.73-1.37	5	.53-1.59*	4	
<i>Raetians II</i>													
	Average	3	.51		4.0		.087		1.31		.75		cf. Raetian I, Wroxeter
	Range		.36-.66	3	2.8-5.2	3	.061-.113	2	.92-1.70	3	.52-.98	3	Region
124	DECMITIVS		.57		4.5		.052		1.07		1.01		
125	"		.51		5.2		.051		1.29		.97		
126	illeg. \		.74		5.0		.065		1.28		1.41		
127	illeg. f (same)		.30		3.9		.041		1.17		.50		
134	DIS/LDB		.83		4.7		.105		1.49		.58		
30	"		1.15		5.2		.078		1.15		.63		
129	tm		.58		5.4		.066		1.20		1.45		
130	BRCO		.52		3.7		.063		1.41		.44		
132	BRICO		.47		5.0		.116		1.67		.45		
131	C.C.M.		.56		4.1		.102		1.48		.75		
137	JANIACO (?)		.37		5.0		.075		1.17		.94		
135	AME		.51		5.2		.065		1.31		1.02		
133	tm		.52		4.5		.097		1.31		.96		
97	tm		.78		4.0		.155		.94		1.05		
136	DOC(LIS) III												
	(Die A)		.55		~ 6.0		.078		1.15		1.15		
193	DOC(LIS) III												
	(Die B)		.88		3.1		.054		1.48		.61		
194	DOC(LIS) III												
	(Die C)		.57		3.0		.048		1.40		.42		
191	SIMILIS (Die A)		.62		2.6		.061		1.08		.32		Contrast 'Nene Valley' No. 88

*KEY TO TABLES

S: Serial number of the samples in the comparative material.

N: Number of samples in the reference group.

Average: Average values of the concentrations in the reference samples.

Range: Average $\pm 30\%$ average.

n: Number of reference samples which have concs. in this range.

tm: Trade mark.

htm: Herringbone trade mark.

illit.: illiterate potter.

illeg.: illegible stamp.

*: In these cases range extended to average $\pm 50\%$ average.

Where appropriate, the names of potters whose mortaria have been used for Reference samples are noted in the 'Remarks' column.

K. F. HARTLEY AND E. E. RICHARDS

W. MIDLANDS & WALES

S	Kiln area or Potter's name	N	%Na ₂ O	n	%MgO	n	%MnO	n	%TiO ₂	n	%CaO	n	Remarks
	<i>Wroxeter Region</i>	10											DOCILIS II (4), DECANIVS (6)
	Average		.20		.96		.021		1.07		.48		
	Range		.14-.26	8	.67-1.25	7	.015-.027	7	.75-1.39	9	.34-.62	8	
92	illit.		.18		.79		.011		.77		.53		
93	AXCH		.16		.79		.014		.94		.34		
94	MELVS I		.09		.87		.016		1.20		.34		
95	DOCILIS I		.36		1.83		.029		.76		.30		
	<i>Raetians I</i>	3											cf. Raetians II, Wilderspool
	Average		.67		3.2		.057		1.08		.42		
	Range		.33-1.01*	3	2.2-4.2	3	.029-.085*	3	.54-1.62*	3	.29-.55	3	
	<i>Holt (Denbigh)</i>	3											
	Average		.78		~9		.10		1.07		.59		
	Range		.55-1.01	3		3	.070-.130	2	.75-1.39	3	.41-.77	3	
	<i>'Caerleon'</i>	3											
	Average		.95		2.7		.037		.63		.39		
	Range		.66-1.24	3	1.9-3.5	3	.026-.048	2	.44-.82	3	.27-.51	3	
78	<i>'Caerleon' D</i>		1.0		2.4		.015		.62		.34		

NORTH-EAST ENGLAND

S	Kiln area or Potter's name	N	%Na ₂ O	n	%MgO	n	%MnO	n	%TiO ₂	n	%CaO	n	Remarks
	<i>Corbridge</i>	2											SATVRNINVS III (2)
	Average		.22		.60		.024		1.19		.49		
	Range		.11-.33*	2	.30-.90*	2	.017-.031	2	.83-1.55	2	.34-.64	2	
36	SVLLONIAI (VS)		.29		.48		.045		.65		.44		} cf. Brockley Hill
37	"		.32		.41		.036		.47		.41		
38	"		.34		.52		.044		.70		.38		
40	ANAVS		.38		.69		.031		.64		.33		
41	"		.43		.98		.044		.62		.45		
42	CVDRE(NVS)		.28		.55		.078		.62		.45		
19	BELLICVS		.27		.78		.042		.94		.52		
39	"		.30		.90		.013		1.19		.58		
	<i>Nr. Doncaster</i>												
	(a) <i>Rossington Bdge.</i>	5											SARRVS (4), SETI- BOGIVS
	Average		.31		1.71		.034		.71		.37		
	Range		.22-.40	5	1.20-2.22	4	.024-.044	4	.50-.92	3	.26-.48	5	Contrast Warwickshire Nos. 16 and 18
	(b) <i>Cantley</i>	4											'VBRN' (3)
	Average		.34		.96		.014		.80		.39		
	Range		.24-.44	4	.67-1.25	4	.010-.018	3	.56-1.04	3	.27-.51	4	
111	tm		.23		1.44		.033		.90		.38		cf. (a)
112	tm		.24		.44		.013		.98		.33		} cf. (b)
113	tm		.24		.55		.013		1.04		.33		
106	illit.		.25		1.75		.017		1.40		.34		} cf. (a) & (b)
107	tm		.28		1.67		.014		1.73		.34		
109	DICCIA		.17		1.34		.012		1.22		.41		
110	illit.		.19		2.17		.051		1.57		.34		
	<i>Lincoln area</i>												
	<i>South Carlton</i>	2											VOROLAS, CRICO
	Average		.17		.38		.012		2.12		.56		
	Range		.12-.22	2	.27-.49	2	.008-.016	2	1.48-2.76	2	.39-.73	2	
	<i>Technical College</i>	1											VITALIS I
	Average		.30		.36		.012		2.00		.64		
33	AESICO		.19		.27		.011		2.34		.67		
84	CRICO		.14		.25		.123		1.75		.38		

SPECTROGRAPHIC ANALYSIS OF SOME ROMANO-BRITISH MORTARIA

MIDLANDS

S	Kiln area or Potter's name	N	%Na ₂ O	n	%MgO	n	%MnO	n	%TiO ₂	n	%CaO	n	Remarks
	Warwickshire <i>Mancetter</i>	10											SENNIVS (3), MAVRVS (3)
	Average		.27		.83		.045		1.61		.41		
	Range		.19-.35	6	.58-1.08	8	.031-.059	5	1.13-2.09	7	.29-.53	10	
150	GRATINVS		.20		1.03		.017		1.70		.41		
151	"		.24		.55		.015		1.98		.45		
	<i>Hartshill</i>	4											VITALIS IV (2) MINOMELVS (2)
	Average		.16		.68		.017		1.25		.37		
	Range		.11-.21	4	.48-.88	4	.012-.022	2	.87-1.63	4	.26-.48	4	
16	SARRVS		.24		.62		.013		.82		.49		} contrast Rossington Bridge
18	"		.18		.62		.013		1.06		.46		
261	VITALIS IV		.18		.90		.16		2.01		.46		
90	G. ATTIVS MARINVS		.21		.52		.013		1.0		.49		Contrast Radlett I & Colchester I
	<i>Nene Valley Stibbington</i>	5											
	Average		.22		.28		.011		1.35		.66		
	Range		.15-.29	4	.20-.36	5	.008-.014	5	.94-1.76	5	.46-.86	5	
88	SIMILIS (Die A)		.14		.34		.013		1.72		.44		cf. North-west No. 191

SOUTH-EAST ENGLAND

S	Kiln area or Potter's name	N	%Na ₂ O	n	%MgO	n	%MnO	n	%TiO ₂	n	%CaO	n	Remarks
	Verulamium Region <i>A Brockley Hill</i>	5											MATVGENVS (4), MELVS 1
	Average		.15		.42		.014		.54		.50		
	Range		.10-.20	4	.29-.55	4	.01-.018	4	.38-.70	5	.35-.65	5	
	<i>B Radlett I</i>	4											CASTVS (3), G. ATTIVS MARINVS
	Average		.14		.33		.01		.57		.51		
	Range		.10-.18	4	.23-.43	3	<.01-.013	4	.40-.74	4	.36-.66	3	
	<i>C Radlett II</i>	4											DRICCIVS (2), MICTV[S (2). N.B. different Mg. for DRIC- CIVS and MICTV[S
	Average		.06		2.02 or		<.01	4	.93		.65		
	Range		.04-.08	4	.64		—		.65-1.21	4	.45-.85	4	
	<i>D 'LVGVDPNVN'</i>	5											ALBINVS (3), RIPAN- VS TIBER F., Q. RVTLIVS RIPANVS
	Average		.16		.42		.015		1.41		.71		
	Range		.11-.21	4	.29-.55	4	.010-.020	4	.99-1.83	5	.50-.92	5	
	<i>E Verulamium, Pit 6</i>	5											ROA (2)
	Average		.07		.74		.009		1.22		.54		
	Range		.05-.09	5	.52-.96	5	.006-.012	4	.85-1.59	5	.38-.70	5	
59	G. ATTIVS MARINVS		.12		.53		.023		.52		1.40		cf. (B)
223	TMH		<.05		.65		<.01		.65		.85		Contrast Colchester No. 222
218	SEXTVS VALER- IVS IV [.05		.28		.18		.59		.80		Contrast Reference Group, Colchester I
229	APRILIS		.23		.44		<.01		1.07		.38		Contrast Colchester I Nos. 215 and 216

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SOUTH-EAST ENGLAND (*continued*)

Kiln area or Potter's name		N	%Na ₂ O	n	%MgO	n	%MnO	n	%TiO ₂	n	%CaO	n	Remarks
East Anglia & Kent <i>Hevingham</i> (Norfolk)		3											INGENVIS, ESAMVS and an illiterate potter
Average			·47		1·00		·071		1·05		1·59		
Range			·23-·71*	2	·50-1·50*	3	·050-·092	3	·73-1·37	3	1·11-2·07	3	
168	OREH		·55		·98		·028		1·07		3·8		
165	AESVMINVS		·59		1·32		·036		·84		4·0		
237	"		·46		1·67		·047		·67		4·5		
<i>Grimstone End</i> (Suffolk)		3											
Average			·12		·67		·031		·46		5·6		
Range			·08-·16	3	·47-·87	3	·022-·040	2	·32-·50	3	3·9-7·3	3	
277	Unstamped		·24		1·43		·049		·88		5·5		
<i>Colchester I</i>		6											The SEXTI VALERII (4) SEVERVS(2) Contrast Verulamium Region 218
Average			·53		1·10		·070		·53		8·3		
Range			·37-·69	4	·55-1·65*	6	·049-·091	4	·37-·69	5	5·8-10·8	6	
236	C. HERME(S)		·39		1·22		·112		·66		7·8		
214	CRICIRO I		·23		1·50		·054		·57		11·3		
61	SEXTVS VAL (ERIVS) [·25		·75		·01		·67		1·10		
217	" "		·47		2·51		·052		·91		1·12		
215	APRILIS "		·53		1·33		·050		·52		8·4		} Contrast Verulamium Region No. 229
216	"		1·10		1·01		·11		·53		10·7		
222	TMH		·25		1·39		·071		·54		~11		} Contrast Verulamium Region No. 223
219	G. ATTIVS MARINVS		·54		1·53		·17		·63		10·2		
221	" "		·38		1·17		·16		·51		~11		} Contrast Radlett I and Warwickshire No. 90
<i>Colchester II</i>		10											
Average			·29		·90		·046		·60		4·6		MARTINVS, DVBIT- ATVS, REGALIS TITVS, MESSOR, CVNOPECTVS, htms. (4).
Range			·15-·44*	9	·63-1·17	8	·023-·069*	8	·42-·78	7	3·2-6·0	8	
66	MESSOR		·14		·93		·036		·93		2·1		
72	htm		·74		1·50		·024		·85		2·7		
73	htm		·10		·38		·050		·81		1·7		
161	htm		·31		·57		·055		1·56		1·5		
67	htm Y		·32		1·13		·048		·37		3·7		
163	htm Y		·40		1·63		·056		1·20		3·7		
162	htm E		·20		1·96		·082		1·67		2·6		
164	htm R		·16		·35		·056		1·37		1·2		
201	htm C		~1·5		2·08		·031		·52		3·5		
65	htm ZF		·28		1·51		·048		·41		3·1		
<i>Canterbury</i>		4											
Average			·19		2·31		·056		·88		4·8		
Range			·13-·25	3	1·62-3·00	4	·039-·073	4	·62-1·14	4	3·4-6·2	4	
158	htm W		·54		1·86		·044		1·12		3·9		
159	htm U		·35		1·60		·029		1·06		4·0		
160	htm U		·49		1·60		·117		1·04		4·1		

SPECTROGRAPHIC ANALYSIS OF SOME ROMANO-BRITISH MORTARIA

S	Kiln-area or Potter's name	SOUTHERN ENGLAND										Remarks	
		N	%Na ₂ O	n	%MgO	n	%MnO	n	%TiO ₂	n	%CaO		n
	Thames Valley												
	<i>Littlemore</i>	2											Trademarks (2)
	Average		·13		·79		< ·01		·85		·48		
	Range		·09-·17	2	·55-1·03	1		2	·59-1·11	2	·34-·62	2	
	<i>Rose Hill</i>	3											Trademark; unstamped
	Average		·23		·82		·012		1·26		·72		(2)
	Range		·16-·30	2	·57-1·07	3	·008-·016	3	·88-1·64	2	·50-·94	3	
	<i>Rose Hill</i>	2											Colour-coated
	Average		·45		1·20		·022		1·00		·77		
	Range		·31-·59	2	·84-1·56	2	·015-·029	2	·70-1·30	2	·54-1·00	2	
	<i>Cowley</i>	3											VOSSVLLVS (2);
	Average		·30		·68		·01		·87		·55		unstamped
	Range		·21-·39	2	·48-·88	3	< ·01-·011	3	·61-1·13	3	·38-·72	3	
	<i>Dorchester</i>	1											Trademark
			·28		·80		·019		1·39		·63		
	<i>Dorchester</i>	2											Colour-coated;
	Average		·39		2·20		·016		·91		1·40		
	Range		·27-·51	2	1·5-2·9	2	·011-·021	2	·64-1·18	2	·70-2·1*	2	
	<i>Sandford</i>	2											Trademark; unstamped
	Average		·39		·80		·017		·98		·62		
	Range		·27-·51	2	·56-1·04	2	·012-·022	2	·69-1·27	2	·43-·81	2	
	<i>Sandford</i>	2											Colour-coated;
	Average		·33		1·08		·014		1·05		·74		
	Range		·23-·43	2	·76-1·40	2	·010-·018	2	·73-1·37	2	·52-·96	2	
	<i>Headington</i>	1											Unstamped
			·24		·84		·01		·97		·75		
	New Forest												
	<i>Island Thorns</i>	3											Unstamped
	Average		·12		·53		·011		1·14		·33		
	Range		·08-·16	3	·37-·69	3	·008-·014	3	·80-1·48	3	·23-·43	3	
	<i>Ashley Rails</i>	4											Unstamped
	Average		·14		·48		·008		1·27		·28		
	Range		·10-·18	4	·34-·62	4	·006-·010	4	·87-1·65	3	·20-·36	4	
	<i>Ashley Rails</i>	3											Colour-coated;
	Average		·13		·64		·01		1·22		·30		
	Range		·09-·17	3	·45-·83	3		3	·85-1·59	3	·21-·39	3	

Recent Evidence for Land Transport in Europe outside the Mediterranean Area before the Late Bronze Age

by GLADYS PIKE

In a note to his article 'The Diffusion of Wheeled Vehicles' (Berlin, 1954)¹ the late Professor V. G. Childe mentioned the discovery of a clay model waggon at Budakalász, Hungary, and dated it between 2200 B.C. and 2000 B.C. Since then incontrovertible proof of wheeled transport in Europe before the Urnfield period has made it desirable to collect together all the available evidence in order to assess the extent and methods of land-transport at this early period.

The evidence is of three types: 1. Clay models of vehicles and wheels; 2. Actual remains of wheels; 3. Roads and paths made of wood, preserved under peat.

CLAY MODEL WAGGONS IN THE MIDDLE DANUBE BASIN

Since the construction of wheels requires good tools, preferably of metal, it is not surprising that the first representations of wheeled vehicles occur in Hungary and Transylvania. The latter area seems to have been the source of large deposits of native copper, worked and traded at the time of the Bodrogkeresztur culture which stretched throughout north-east Hungary beyond the Tisza, and is the equivalent of Dr. Kutzián's Hungarian Copper Age II (c. 2150–2000 B.C.).² Now the Bodrogkeresztur culture is the immediate predecessor of the Baden-Pecél culture (Kutzián's Copper Age III, c. 2100–1900 B.C.), and it is in that culture that the first of the series of clay model waggons from the Middle Danube Basin was discovered.

¹ Childe, V. G., 'The Diffusion of Wheeled Vehicles', *Ethnographisch—Archäologische Forschungen*, 2 (Berlin, 1954), 14.

² Bognár-Kutzián, I., 'The Copper Age Cemetery of Tiszapolgár-Basatanya', *Akadémiai Kiado* (Budapest, 1963), 553. Kutzián, however, calculates that if approximate dates were established on the basis of radio-carbon tests instead of traditional methods, they would read:

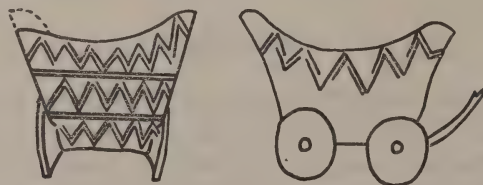
Copper Age I (Tiszapolgár) c. 3300–3100 B.C.

Copper Age II (Bodrogkeresztur) c. 3100–2700 B.C.

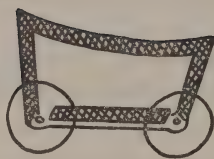
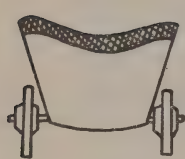
Copper Age III (Baden) c. 2700–2400/2300 B.C.

The re-dated C.14 date of the Transylvanian Decea Muresului cemetery, usually taken as a local variant of Bodrogkeresztur (3380 ± 80 B.C., Gr.-N 1985), suggests that Bodrogkeresztur may be even earlier.

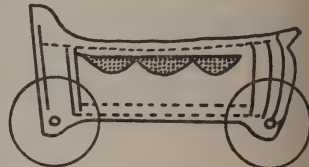
The *Budakalász model waggon* (Fig. 1a). This clay model waggon was found in a symbolic grave in the Budakalász cemetery in the Baden-Pecél region.³ It has an almost square base and high sides curving up to meet the dashboards at a point. The four flat wheels are stuck to the sides, but the axles are merely represented by double lines incised on the underside of the base. The stump of the curious curved pole suggests to Boná⁴ that it is a waggon-shaped vase rather than a model waggon. The decoration consists of pairs of zig-zag lines making a simple border.



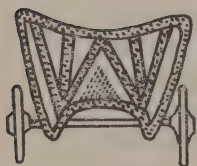
a. Budakalász



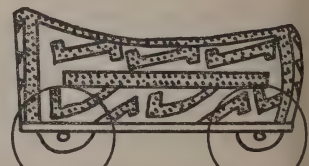
b. Szamosujvár



d. Gyulavarsánd



c. Wietenberg



e. Novaj

FIGURE 1 Middle Danube Clay Model Waggon
(not to scale: based on illustrations in *Acta Archaeologica Hungaricae* 12 (1960))

*Fragmentary models.*⁵ Four other large pieces of clay model waggons of early date have been found in the Middle Danube basin, none of them possessing poles, wheels or axles, which were presumably made of wood. A revolving axle must have made the 8 mm. groove extending from the axle-hole of the

³ Soproni, S., 'A Budakalászi Kocsi', *Folia Archaeologica*, VI (Budapest, 1964), 29-34; 198-199.

⁴ Boná, I., 'Clay Models of Bronze Age Wagons and Wheels in the Middle Danube Basin', *Acta Archaeologica Hungaricae*, 12 (Budapest, 1960), 89.

⁵ *ibid.*, 86.

Novaj specimen (Fig. 1e) worn quite shiny from the continual revolutions of the axle. Unfortunately, none of the fragments were found under stratified conditions, but all come from sites of, or related to, Mozsolic's Hungarian Bronze Age II and III.

Waggons of Type A

I. Boná has endeavoured to date these fragments more closely by shape and decoration⁶. He considers the fragments from Szamosujvár, a site of the Transylvanian Wietenberg culture (Fig. 1b) and from Wietenberg itself (Fig. 1c) to be the earlier. Though they are dated to Ottomani II, which is equivalent to Tószeg B in Hungary, they have the same high sides and square base as the Budakalász specimen, and Boná classes the three waggons as Type A.

Waggons of Type B

The wagons of Type B, copied by the potters who made the Novaj (Fig. 1e) and Gyulavarsánd models (Fig. 1d), must have been more functional than their predecessors, having low sides for greater convenience in loading and greater length to increase their capacity. Boná believes that the large fragment from Novaj, Borsod County (Hungary) should be from the Hatvan settlement in that county, where model wheels have been found. If this assumption is correct it can be dated to Period II of the Hungarian Bronze Age (Mozsolics) which ends about 1500 B.C.⁷ The decoration is of the Transylvanian Wietenberg culture, and Boná considers it to be an import.

The Gyulavarsánd model waggon was found by a farmer in his vineyard just outside the rampart of the Laposshalom fortress, and should be connected with the settlement site. It should, therefore, belong to Period III of the Hungarian Bronze Age (c. 1500–1250 B.C.).

Small Fragments of Waggon

Smaller fragments of waggons of Bronze Age date are reported from Szamosujvár, Békés, Ottomani A and Tószeg B.⁸

EARLY CLAY MODEL WHEELS IN SOUTH-EAST AND CENTRAL EUROPE⁹

Clay models of solid disc-wheels have been found on the same sites as the waggons, and on many others. They vary from 4–12 cms. in diameter, are usually flat discs with a strongly projecting nave (Fig. 2b and c) and seldom show any signs of construction. In particular, there is no example of the tripartite disc which is typical of the Late Bronze Age in Europe, though struts (Fig. 2e), tyres (Fig. 2a) and holes to lighten the weight are occasionally portrayed.

⁶ *ibid.*, 87–89.

⁷ Piggott, S., 'Neolithic and Bronze Age in East Europe', *Antiquity*, XXXVI, (1960), 287.

⁸ *loc. cit.*, footnote 4, 86.

⁹ *ibid.*, 89–94.

All cultures containing Chalcolithic and Bronze Age model wheels in the Middle Danube Basin are within trading distance of the metalliferous region of Transylvania. The earliest model wheels, apart from those attached to the Budokálász waggon, come from the Chalcolithic Zók-Vučedol culture on the lower Drave and Save, which follows Baden in most of its area.

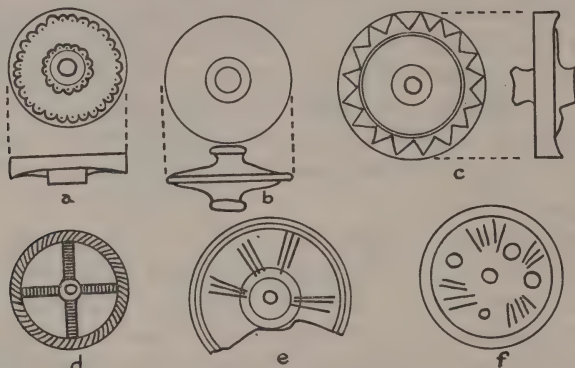


FIGURE 2 Typical Clay Model Wheels
(not to scale: based on illustrations in *Acta Archaeologica Hungaricae* 12 (1960))

The advent of the Bronze Age in the Middle Danube Basin marks a shift in the distribution of model wheels. They are now completely absent in the Zók-Vučedol area; only a few strays from the Hatvan culture occur in the old Baden province, and they are not typical of the Kisapostag, Perjamos or Tószeg cultures. Indeed, these primitive and unwieldy waggons, especially Type A, are obviously agricultural vehicles and could have only a limited use in the trading cultures of the Amber Route. On the other hand the mining and agricultural people of Transylvania not only produced two (possibly three) of the model waggons, but also the earliest Bronze Age wheel from Vlădhâza, an Early Bronze Age settlement site of the Coțofeni-Kolozskarpád culture which succeeds Coțofeni, an eastern version of Baden, and Boná would like to date some of the Szamosujvár specimens to the same period. The other Transylvanian wheels belong to the Wietenberg culture.

Twenty-four model wheels have been found on sites of the agricultural and pastoral Wietenberg culture, which spread westward from the Upper Tisza and is dated to Period II of the Hungarian Bronze Age.

The Magyarád culture, in which five specimens have been found, lies on the upper reaches of the Danube above Budapest, and towards the eastern outliers of the Hatvan block. This culture is contemporary with Late Hatvan, from which it may have borrowed its knowledge of wheeled vehicles.

The territory of the Gyulavarsánd and Ottomani cultures, where two fragments of waggon and a number of wheels occur, lies on the eastern Maros and its tributaries. Here and in the isolated Vattina culture wheels may be traced to the end of Hungarian Bronze Age III.

The only clay model solid disc-wheel west of the complex described was found at the settlement site of Böheimkirchen, Lower Austria, placed by Childe and Milojević in the Early Bronze Age, though Boná would date them much later (c. 1450–1350 B.C.).¹⁰

REPORTS OF THE EARLY KNOWLEDGE OF WHEELED VEHICLES IN AREAS OUTSIDE THE MIDDLE DANUBE BASIN

It has been suggested that two other cultures of the Chalcolithic possessed the knowledge of wheeled vehicles.

The absence of a protruding nave and the uniformly small size of the Jordanova clay discs strongly suggest that they were spindle-whorls, and the relationships of the Jordanova culture are with the Bodrogkeresztur culture, where evidence of wheeled vehicles is completely absent.

The burial of animals for food is common in the Baden-Pecél culture, and it would be unwise to infer the existence of hearses from the bones of pairs of animals in burials at Alsónómedi and Budakalász.¹¹

Conclusions

1. Model waggons and wheels occur in the Middle Danube Basin in Hungarian Copper Age III (c. 2100–1900 B.C. or 2700–2400/2300 B.C. if based on radio-carbon findings)—Hungarian Bronze Age III (c. 1500–1250 B.C.). They are the commonest in Bronze Age II and contemporary sites in Transylvania.

2. The waggons have oblong bases and high sides, and one infers from the Budakalász specimen that they were pole-drawn, presumably by oxen. They are related to early specimens from Mesopotamia and Anatolia described in Childe's 'Diffusion of Wheeled Vehicles'. They bear no relationship to the waggons common from the Urnfield period to the 19th century A.D. in Europe north of the Mediterranean region and south of an imaginary line dividing the waggon zone from the cart-using areas of the Highland Zone of Britain, North Sweden, Finland and North Russia. These later waggons, still in use in Scandinavia and Bohemia, have a framework made by the fusion of two triangular carts into a single composite vehicle, with the fore-carriage almost immovable in relation to the rear carriage.¹² (Cave-engraving, Langon, Sweden, Late

¹⁰ *ibid.*, 90.

¹¹ *ibid.*, 108.

¹² Jenkins, J. G., *The English Farm Wagon* (Lingfield, 1961), 5.

Bronze Age; ritual waggon on a sherd from Ödenburg, Hungary, Late Bronze Age; Djebjerg waggon, Jutland, c. 100 B.C.).

3. The absence of any connection between model waggons and wheels and the burial of the dead or other ritual customs, at this early period in the Middle Danube Basin, must be emphasized. There may, however, be a clue in the 8 mm. groove worn by the axle of the Novaj specimen which will lead us to the purpose for which these models were constructed. A burial or ritual custom which involves the repeated running of a model waggon up and down the floor is inconceivable, but a child will play with a toy vehicle all day in exactly this manner—the clay model wheels and waggons are childrens' toys.

THE SPREAD OF CLAY MODEL WAGGONS AND WHEELS FROM ANATOLIA

It seems probable that the knowledge of wheeled vehicles crossed from Anatolia to Thrace in the second half of the 4th millennium B.C., using current radio-carbon datings. The custom of making clay model wheels developed in Europe, and the earliest model wheels were found at Veselinovo in Eastern Bulgaria, which is contemporary with late Vinča, for which a radio-carbon date of 3895 B.C. (Gr.-N1537) is given. Some 50 kilometres west of Veselinovo another clay model of a solid block wheel occurred in the Dontshovo-Mogila settlement of the Late Gumelnița culture.¹³ This was an early Copper Age culture whose native tools could be as Childe suggests, the beginning of the Middle Danube series. The Late Gumelnita culture belongs to the first half of the 3rd millennium B.C.

EARLY TWO-WHEELED CARTS IN THE PONTIC STEPPES¹⁴

The idea of two-wheeled carts seems to have crossed the Bosphorus. Such carts taking much the same route as the waggons through Bulgaria, arrived at the south-east extremity of the Ochre Grave culture province, where they are preserved in chieftains' burials. The remains of full-sized wooden carts with a simple triangular base, and solid block wheels like those of Central and Western Europe were found in royal graves at Storozhevaya Mogila near Dniepropetrovsk and at Akkerman in the Melitopol district. A. I. Terenozhkin dated the two wheels (48 cms in diameter) from Storozhevaya Mogila and the Akkerman cart to the oldest pit-graves in that area solely on the type of grave. Again, B. A. Latynin dated the Tri Brata kurgan with its three carts and clay model of a covered 'arba', to a later part of the pit-grave period from the burial rites.

¹³ *loc. cit.*, footnote 4, 98–99.

¹⁴ *ibid.*, 96–97.

Gimbutas has shown that this culture, with pit-graves under barrows, did not spread from north of the Caspian Sea into the Dnieper valley until her phase II, which was contemporary with Cucuteni A.¹⁵ The latter now has a radio-carbon date of 3380 ± 80 B.C. (Gr.—N 1985).

Five clay models of block wheels are reported from the territory north of the Black Sea by L. S. Klejn.¹⁶ Two, from an 'ash-mound' at Magala on the Pruth are attributed to the 11th–9th century B.C. One from a burial of the Rafter Grave culture at Preslav, north of the Sea of Azov is considered to belong to the end of the 2nd millenium B.C. The third site, Kobyakovo-Gorodische, on the Don, which possesses two specimens, is radio-carbon dated to 880 ± 110 B.C. (No laboratory number is given).

These models are very late, and it is difficult to relate them with the early model wheels from the Balkans or the Middle Danube series which was under the domination of the Urnfield Culture at this time.

It should be emphatically stated at this point, that our knowledge of wheeled vehicles in prehistoric and even Classic times is dependent on the art-styles, fashions, superstitions and religions. The ox-waggon from Trialeti, Georgia, shows that waggons and carts were known at an early period (1750–1500 B.C. by conventional dating).¹⁷

TWO-WHEELED CARTS USED AS HEARSEs BEFORE THE LATE BRONZE AGE

We must also reverse the dictum, based on Late Bronze Age evidence, that four-wheeled waggons are always connected with burial and two-wheeled carts with agricultural and pastoral pursuits. From c. 2700–1250 B.C. the waggons of the Middle Danube Basin are represented by clay models found exclusively on settlement sites, whilst carts, both real and model, are interred in graves in the Pontic Steppes and Caucasus regions.

THE WESTWARD SPREAD OF THE CART

The discovery of the two-wheeled carts in the Pontic Steppes, and in particular the model cart at Tri Brata, inclines one to remove the famous 'Fatyanovo wheels' from the suspense-account, and consider them as genuine wheel models, especially as they are spaced as though a model cart of some perishable material had existed between them. O. N. Bader, who published the Balanovo cemetery, dates them between the 17th or 18th century and the 12th century B.C., and it seems likely that the knowledge of the two-wheeled cart had spread to the Cuřaş region up the Volga from the Pontic Steppes.¹⁸

¹⁵ Gimbutas, M., 'Notes on the Chronology and Expansion of the Pit-grave Kurgans', *L'Europe à la Fin de l'Age de la Pierre* (Academie Tchechoslovaque des Sciences, 1961), 200.

¹⁶ Klejn, L. S., 'Bronze Age Earthen Wheel Models from the Northern Shore of the Black Sea', *Archaeologiai Ertesito*, 90 (1963), 62–63.

¹⁷ *loc. cit.*, footnote 1, 14.

¹⁸ *loc. cit.*, footnote 4, 98.

The engravings on the walls of the Long Stone Cist with porthole slab at Löhne, Züschen, Hesse, show oxen yoked in pairs (occasionally threes) drawing a two-wheeled vehicle represented by a line or semi-circle cut by the pole.¹⁹ The vehicles and oxen are drawn from above, but this method of reproduction is normal among primitive people, and must not be considered as evidence for any connection with other cultures.

Chevron decoration on the top of two of the megaliths, and sherds from the layer immediately under the roof are typical of the Single Grave people, but the carts and oxen are depicted on the centre of the uprights or on small stone slabs found loose in the tomb, so it seems probable that they were executed by its original builders, whose pottery includes sherds of imported Collared Flasks of the First Northern Culture.²⁰

This chevron technique is typical of the Saale Single Grave people further east, who buried their dead in stone-built, but not megalithic, tombs whose interiors are decorated to resemble the inside of a house. T. G. E. Powell considers that the Saale graves are ultimately derived from the 'house-graves' with wooden roofs whose walls are sometimes hung with textile hangings (kurgan No. 7, Tri Brata), which are found in the Ochre Grave Culture of the Pontic Steppes and Caucasus.²¹ The conception of 'house-graves' must have travelled from South Russia to the Saale region across the territory of the Globular Amphora people who buried their dead in stone cists, though the interior decoration is lacking in that culture.

He also notes that two graves in the Saale region, at Nietleben and Schopkau, seem to be earlier than the rest.²² They have the wedge shape associated with the Funnel Beaker sequence and contain sherds of Late Bernburg pottery, but their interior is ornamented by a crude version of the chevron decoration of Döhlau, Göhlitzsch and the upper layer at Löhne. Powell considers that this 'perfunctory decoration' together with a wooden floor or platform at Nietleben suggests external contacts between the T.R.B., and Single Grave people before the actual settlement of the latter in Central Germany. But two-wheeled carts, drawn by oxen harnessed to a pole, are as characteristic of the Ochre Grave cultures as 'house-graves', and it seems extremely unlikely that their appearance in Central Germany in a late T.R.B. context is mere coincidence—the new burial customs found favour at Nietleben and Schopkau: the makers of the Löhne Gallery tomb at Züschen retained their burial rite, but decorated the megaliths with incised depictions of ox-drawn carts, introduced from the same region at approximately the same period.

¹⁹ Powell, T. G. E., 'Megaliths and Other Art, Centre and West', *Antiquity* XXXIV (1960), 184.

²⁰ *ibid.*, 182–183.

²¹ *loc. cit.*, footnote 19, 187.

²² *ibid.*, 186.

RECENT EVIDENCE FOR LAND TRANSPORT IN EUROPE

The dating of the Züschen tomb is very difficult. Two Funnel Beakers of the type common in megaliths were found in a pit below the mound of the megalithic Tomb D.32 at Odoorn by Van Giffen. They have been dated to 2640 B.C. (Gr.—N 2226), but Dutch megaliths are considered to be rather late. The Lohne tomb could be considered to date to the first half of the 3rd millennium B.C.

EARLY WOODEN TRACKWAYS

In north-west Germany, Holland and south-west Britain, the raised bog conditions of the Subboreal Period, Pollen Analysis Phase VIIb (land and sea level relations to the English pollen-sequence, Zeuner, *Dating the Past*, Fig. 38), made it necessary that Neolithic man should bridge the pools and channels which are found on all bog-surfaces, especially those which had recently been in a state of erosion. As Godwin states, the use of tree-stems laid lengthways is the most obvious and economical answer to the problem and it would be most unwise to assume any ethnic or cultural connection between the people who made the longitudinal tracks of whole or split timbers in these regions, especially as there are considerable differences in the details of their construction.

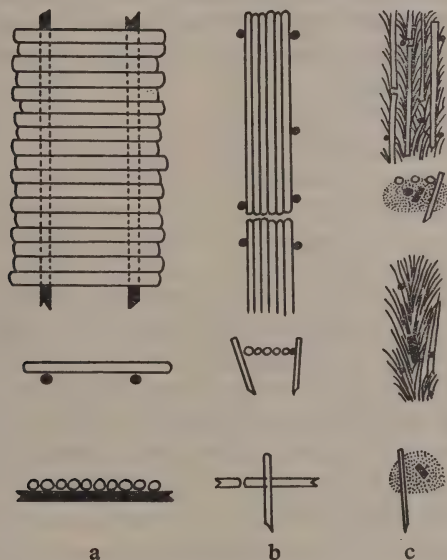


FIGURE 3

Wooden Trackways in north-west Germany
(not to scale : based on illustrations in *Die Umschau im Wessenschaft und Technik* 6 (1960))

NEOLITHIC TRACKS WITH LONGITUDINAL TIMBERS

North-west Germany. Herr Hajo Hayen, making a reappraisal of old material in the light of his new investigations and modern methods of dating, has identified two types of wooden trackways whose timbers are laid in the

same direction as the track, the Pfahlstege (Fig. 3b) and Knüppeldamme²³ (Fig. 3c). The best example of the former in north-west Germany is probably Pfahlstege XXV at Ipweger Moor.²⁴ Girders of alder and birch trunks were laid on a foundation of brushwood, sticks and single timbers. The upper surface consisted of alder, birch and Scotch fir-stems, mostly 4–5 m. in length and up to 19 cm. in diameter, trimmed on the underside and with their boughs neatly removed from the trunk. The path was held in place by stout stakes, driven into the bog at the end of the cross-timbers (Fig. 3b). The pollen-spectrum suggested that the track should be dated to the Neolithic period, whilst other Pfahlstege in Ipweger Moor, (III (Ip), IV (Ip), V (Ip), VI (Ip)) have been provisionally placed in the transitional period between the Late Neolithic and Early Bronze Age. The substantial construction of these Pfahlstege continues from before 1800 B.C., into the Iron Age.

The Knüppeldamme, (Fig. 3c), dated by Hayen from c. 1800 B.C., to the Late Bronze Age, are a simpler version of the Pfahlstege. An example from Ipweger Moor B is typical.²⁵ The Knüppeldam or Knüppelsteg known as XLVI (Ip) varied from 70–150 cm. in width, and consisted of a thin sheet of sticks, 1–3 cm. in diameter, laid on bare moor and clumps of heather.

Unfortunately the radio-carbon dates of the Pfahlstege and Knüppeldamme or Knüppelstege, published in *Radiocarbon* 5, are very late, covering the greater part of the 2nd Millennium B.C.

Ipwegermoor LI	1160 B.C. Gr.-N 3530	} Pfahlstege
„ V	1410 B.C. Gr.-N 3514	
„ XXV	1460 B.C. Gr.-N 3509	
„ VII	1700 B.C. Gr.-N 3527	
Ipwegermoor LIX	1470 B.C. Gr.-N 3529	Knüppelstege

Holland. A length of wooden trackway, with its timbers laid in the same direction as the track was found by Cranssen in 1819 south of the well-known 'Peatbridge' in the parish of Weerdinge, Drenthe, Holland. A stretch of normal corduroy road laid on girders which, if it is contemporary with the main 'peat-bridge' should be Late Neolithic, narrowed from 300 cm. to 120 cm., and the planks which formed the surface of the road disappeared. Instead, the track now consisted of stems, mainly of fir, laid parallel to the direction of the track, with the blunt ends facing towards Weerdinge.²⁶

²³ Hayen Hajo, 'Zur Bautechnik und Typologie der . . . hölzernen Moorwege und Moorstrassen', *Oldenburger Jahrbuch*, Bd 56, Teil 2 (1957), 83 ff. and 'Moorwege und Moorstrassen aus fünf Jahrtausenden', *Umschau*, 6 (Frankfort am Main, 1960), 178–9.

²⁴ Hayen Hajo, 'Imweger Moor B', *Die Kunde* N.F.9 (Hanover, 1958), 38. (can be consulted in Ashmolean Library).

²⁵ *ibid.*, 42.

²⁶ Zeist W. van, 'De Valtherbrug', *Nieuwe Drentse Volksalmanak* 76 (1958), 36–37.

Another section of track found by Cranssen is of great interest as it seems to have been the remains of a pathway similar to the Pfahlstege of Ipweiger Moor B.²⁷ It had been constructed from oaken planks about 2 cm. thick and 300–400 cm. long, laid at right-angles to the track and pegged directly into the peat, but so far apart that a man following the path would have to jump from plank to plank. Probably these fixed planks formed the girders of a substantial wooden path whose upper timbers, laid in the same direction as the track, have perished.

Somerset—Three tracks uncovered by peat-cutting since 1948, in the Shapwick–Meare–Ashcote area of Somerset, England, have been fully described by H. Godwin ('Prehistoric Wooden Trackways of the Somerset Levels', *P.P.S.* 1960).

Honeygore Track, which is perhaps the most representative of the Somerset bog-paths,²⁸ was made of substantial stems of birch, 9–10 cm. in diameter, laid on a series of transverse sticks, surrounded above and below by brushwood. The whole structure was pinned down by a series of stakes thrust vertically into the peat in rows, whilst many others pinned down the track obliquely, often in pairs, one pointing forward and the other back. The marks of thick-bladed axes and pollen-analyses of samples taken below the track agree with the radio-carbon dating which places Honeygore Track in the Neolithic period, *c.* 2790 B.C. (Q 431).

Blakeway Farm Track²⁹ is the slightest and narrowest of the three; it was made of bundles of about 20 hazel-stems laid with the butt of one faggot overlapping the thin end of the next, on a brushwood foundation, the whole being kept in place by thin stems thrust obliquely into the sides of the track. Cuts made by thick-bladed axes and the tree-pollen diagram (VII a–b, boundary), reinforce the radio-carbon finding of 2500 B.C. (Q 460).

Honeycat Track,³⁰ though the latest of the three is merely a less sophisticated version of Honeygore, consisting mainly of thin stems of birch, laid on girders and surrounded by brushwood, but lacking the vertical and oblique stakes found in the other track. The stratigraphic situation suggests the Neolithic period, and this dating is confirmed by the radio-carbon findings (Q 430 and Q 427): 4065 \pm 130 B.P. and 4326 \pm 130 B.P., that is, *c.* 2300 B.C.

A polished stone axe of Graig Lwyd rock from Shapwick Heath,³¹ stratified under peat, has a radio-carbon dating taken from the wood on the surface of the fenwood peat close to the place where it was found. This date (*c.* 2580 B.C.,

²⁷ *ibid.*, 39.

²⁸ Godwin, H., 'Prehistoric Trackways of the Somerset Levels', *Proceedings of the Prehistoric Society* 26 (1960), 18.

²⁹ *ibid.*, 17.

³⁰ *ibid.*, 21.

³¹ *ibid.*, 33.

Q 430) together with sherds of Peterborough pottery from Meare Heath and the marks of polished axes on two of the tracks, suggests that the makers of the Meare Heath–Westhay–Shapwick Neolithic tracks belonged to the Secondary Neolithic Peterborough Culture.

It seems most improbable that the north-west German, Dutch and English wooden trackways with timbers laid in the direction of the path, could have been used by wheeled vehicles, or even sledges or slide-cars. Not only would wheels or runners stick between the timbers and cause the track to spread, but the dating of the Somerset tracks, at least, does not allow sufficient time for the knowledge of wheeled vehicles to spread from the East to south-west England. Several of these early tracks, however, are of substantial construction and must have carried a considerable volume of pack-traffic. It is not surprising, therefore, that when wheeled vehicles were introduced into central and northern Europe they are attested in two of these areas and possibly the third.

NEOLITHIC TRACKS WITH TRANSVERSE TIMBERS AND ONE-PIECE DISC WHEELS OF NEOLITHIC AND LATER DATES

North Germany. The Pfahlwege (Fig. 3a), north-west Germany, unlike the famous Bohlenwege of Late Bronze Age date, were made from whole trunks of trees, neatly trimmed.³² A 3 km. stretch of road at Huder Moor, though later, shows the method of construction very clearly. The foundation consisted of long alder and birch trunks, laid along the direction of the road in three rows, with untrimmed branches of various trees strewn between them. Alder, birch and oaken posts, trimmed to a length of 3·6 m. and set very close together at right-angles to the girders formed the surface of the track. These posts were held in position by stakes driven into the ends of the timbers. These tracks, which might be dignified by the name of roads, are a Neolithic and Early Bronze Age version of the classic Bohlenwege or 'plankways', found in the same region, and may well have carried primitive wheeled vehicles. Pfahlwege occur in both the Neolithic and Bronze periods, defined by Hajo Hayen as before 1800 B.C., and from 1800–1200 B.C. No radio-carbon dates are available.

A few material remains of the vehicles which used the Pfahlwege still exist. A number of massive oak block wheels are preserved in the Museum für Naturkinde und Vorgeschichte, Oldenburg. They were found without any related material in a bog at Glum, near Oldenburg, and have been dated to the Neolithic period by pollen-analysis.³³ A yoke, suitable for an ox, from a bog

³² *loc. cit.*, footnote 23, 83.

³³ Post, L. von., Oldeborg, A. and Froman, I., 'Eine Eisenzeitliches Rad aus dem Filaren-see in Södermanland, Schweden', *Antikintets Akademiens Handlingar* del 46 : 1 (Stockholm, 1939), 37.

at Petersfehn, Oldenburg, also dated to the Neolithic by pollen-analysis completes the picture.³⁴

Two other disc-wheels from North Germany should be mentioned: that is the Beckdorf wheel, made from a single section of an alder tree, discovered under 2 m. of peat at Beckdorf, Kr. Stade, Hanover. There is no protruding nave, but the wheel does swell towards the centre.³⁵

It has a diameter of 67 cm and is 6 cm thick at the periphery, 8–10 cm thick at the centre. This wheel has been dated to an early stage in the Northern Bronze Age on grounds of pollen-analysis by S. Schneider, 1938.

The other is from Aulendorf, 20 km. south-east of Buckau, Federsee.³⁶

Holland. In the south-east of the Drenthe province of Holland a number of wooden roads and paths have been discovered, buried under peat, some of which have been dated by pollen-analysis and by radio-carbon analysis to the Late Neolithic in that region, c. 2200–1600 B.C. W. van Zeist has collected together all the evidence which has appeared in publications between 1818, when the first road, the 'Valthe peat-bridge' was investigated by J. W. Karsten, to 1936. The first stretch of road investigated by Karsten stretched for about 2 km from the sand hillocks between the Drenthe villages of Valthe and Weerdinge to similar dunes near Ter Haar.³⁷ He reported it to be a uniform 300 cm in width, composed of fir planks and fir stems of approximately the same length and thickness, trimmed with an axe or adze, but not a saw, and laid on girders made from the young trunks of alder and trees. The under surface of the planks was sometimes worked to fit the girders, ensuring a high degree of evenness for the surface of the road. Alder, birch and oaken sticks had been driven at regular intervals through specially made square holes at the ends of the planks. Investigations between 1818 and 1936 have verified the greater part of Karsten's conclusions, and revealed other lengths of similar 'peat-bridges' all of which appeared to have been constructed for a considerable volume of traffic, possibly wheeled. Then in 1955, a length of track similar to the original Valthe 'peat-bridge', but not part of it, was excavated at Herenstreek, Nieuwe Dordrecht (Parish of Emmen) and dated by pollen-analysis to the Neolithic in Holland.³⁸ Near this road, and in almost the same layer, were three portions of a massive oak wheel, 64.5 cm in diameter before drying. Much of the nave is missing, but it consisted of a thickened area, 7 cm in

³⁴ Clark, J. G. D., *Prehistoric Europe. The Economic Basis* (Methuen, 1952), 308.

³⁵ *loc. cit.*, footnote 33, 38.

³⁶ *loc. cit.*, footnote 33, 37.

³⁷ *loc. cit.*, footnote 26, 24–29.

³⁸ Zeist W. van., 'Twee Neolithische Veevondsten te Nieuw-Dordrecht', *Drentse Volksalmanak*, 75 (1957), 12–15

diameter, surrounding a round axle-hole. There is no sign of protection for the rounded edge of the wheel. The pollen-spectrum of peat clinging to the wheel agrees with the diagram of peat taken from the road; so the wheel, together with the beak-shaped helve of an axe found directly under the peat-bridge should be dated to the Neolithic, as the radio-carbon date of the trackway is 2150 B.C. (Gr.-N 2986).

Three other block-wheels are reported from the provinces of Groningen, Drenthe and Overijssel, all datable to the Late Neolithic period. (Information by courtesy of J. D. van der Waals, Biologisch Archaeologisch Instituut, Rykuniversiteit, Gröningen).

The dating of two sections of another Neolithic trackway in the Parish of Emmen is given in *Radiocarbon* 5—2150 B.C. (Gr.-N 2986) and 2192 ± 55 (Gr.-N 1087). These agree well with the dates of several new block wheels:—

Dertienhuizen A (Groningen) 2065 B.C. (Gr.-N 2878)

Dertienhuizen B (Groningen) 2120 B.C. (Gr.-N 2879)

De Eese (Drenthe) 2075 B.C. (Gr.-N 2368)

Gasselter Boerveen (Drenthe) 2010 B.C. (Gr.-N 3238)

They also correlate with the Single Graves from Anlo, e.g. Anlo 49, which is 2190 B.C. (Gr.-N 851) and Anlo 46b, 2015 B.C. (Gr.-N 1976), both containing all-over-corded Beaker sherds of the Neolithic period in Holland.

Since only the wheels have as yet been found in north-west Germany and Holland it is impossible to know whether they belonged to carts or waggons. One might tentatively suggest that the two-wheeled carts attested by the engravings on the Züschen tomb had also been adopted in this area. Wooden mortuary houses under barrows arrived in Holland with other elements of the Single Grave/Corded Ware culture from the West German Beaker Group towards the end of the 3rd millennium B.C. (radio-carbon datings) and later pottery types continue until nearly 1600 B.C.

Somerset. A fourth track in the Somerset group, Abbot's Way, was recorded in the 19th century and seen by Bulleid in 1933.³⁹ Dymond (1880) reported that it was 145 cm in width and consisted of rude slabs of timber laid face upwards at right-angles to the direction of the track. These timbers were held by two lines of stringers kept in place by sharpened pegs. This track has now been re-discovered and it is even earlier than the Honeycat and Honeygore tracks (2850 B.C. ± 110 , Q 647). Technologically it resembles those tracks constructed for the passage of wheeled vehicles, which seem unlikely to have reached England at such an early period. Still, sledges would need a similar surface.

³⁹ *loc. cit.*, footnote 28, 22.

Denmark. Wooden trackways are not reported from the Danish bogs, possibly because raised-bog conditions were not present in the Neolithic period. Johannes Brøndsted considers the Dystrup and Tindbaek solid disc wheels, found in peat with no other dating material, to be Neolithic.⁴⁰ But all other Neolithic wheels found in Europe are made of a single piece of wood, which suggests that the Dystrup wheel, which was built up from three pieces, is later.

Switzerland. A type of wooden road very different from those of northern Europe occurs in a Neolithic context in Switzerland. In 1937 and 1938 Dr. Theophile Ischer excavated a lake village situated between the modern village of Luscherz and the Hagneck canal on the southern shores of Lake Biel. Two structures, which he considered to be bridges, connected this Neolithic palisaded village of so-called 'pile-dwellings' with the mainland. The first bridge consisted of cross-pieces of timber, resting on piles arranged in rows of three, the overall width being 300 cm and the length 70 m. A second 'bridge' of exactly the same width, length and construction began near the lake-village some 25 m from the first and ran roughly parallel to it. E. Vogt holds that the prehistoric lake-villages of Switzerland were not built on piles driven into the lake bed, but erected on solid, if moist, ground, so there would be no need for bridges in the conventional sense.⁴¹ In that case the 'bridges' must have been roads, built on piles, like many timber trackways in later times. The presence of yokes on the Luscherz site and at Fénil (Vinelz) suggests that wheeled vehicles may have been used in the Middle and Late Cortaillod cultures to which the Luscherz village belongs.⁴² These trackways are of very different construction from those of Northern Europe, but the knowledge of wheeled vehicles could have travelled up the Rhine from central Germany, specially made roads being unnecessary where bog conditions were not present. The presence of Rössen-style vases on Late Cortaillod sites and the Rössen sherds from the Hesse-Westphalian group of megalithic tombs suggests some contact between central Germany and Switzerland in Late Cortaillod times. These Late Rössen sherds are found in Egolzwill III, 2740 \pm 90 B.C. (K 121). If we consider that the knowledge of wheeled vehicles may have preceded the making of clay model wheels, it is possible that the Swiss wheel and yoke are derived from an ultimate Hungarian origin via Lower Austria, in which case the relevant vehicle would be the waggon.

Conclusions

(Radio-carbon dates are used in this section, if available).

1. There is no evidence for any land-vehicle except the sledge in Europe before 3000 B.C., when the first two-wheeled carts are found in chieftain's

⁴⁰ Brøndsted, J., *Danmarks Oldtid I* (Copenhagen, 1938), 149.

⁴¹ Vogt, E., 'Swiss Pile-dwellings', *Antiquity XXXI* (1957), 71.

⁴² Ischer, T., *Pfahlbauten des Bielersees* (Biel, 1928), 43-44.

graves in the Pontic Steppes of Russia and a little later, the earliest clay model waggon at Budakalász, Hungary. There may however, have been a considerable volume of land-traffic in north-west Europe, in the period immediately preceding the introduction of the wheel, attested by the substantial wooden pathways found in the raised-bog areas.

2. Waggon with a box-like body having a rectangular base, probably used as farm-waggon rather than vehicles for long-distance transport, are represented by models found on settlement sites in Transylvania and Hungary from Copper Age III to Bronze Age III (c. 2400 B.C.-1250 B.C.). If one can rely on the evidence of the clay model wheels, they spread as far west as Böheimkirchen, Lower Austria. They do not continue into the Late Bronze Age, when all waggon found or whose bases are depicted in northern and central Europe have a composite base developed from the bases of two two-wheeled carts united by the pole of the hinder cart.

3. The spread of carts is more difficult to follow. From the Pontic Steppes, they seem to have reached Züschen by the first half of the 3rd millennium B.C.

4. Wheeled vehicles are attested in Holland in Late Neolithic times (2065-1880 B.C.). Some kind of wheeled vehicle was used even earlier in Switzerland and probably in south-west England (c. 2700 B.C.). Single wheels, yokes and transverse timbers, however, cannot be taken as safe evidence for any type of vehicle, but it seems probable that the Dutch, Swiss and English wooden tracks were used by carts.

5. Such slight evidence as survives suggests that both carts and waggon had revolving axles.

6. Carts and waggon seem to have been drawn by two oxen yoked to a pole. (Three animals are sometimes depicted on the Löhne tomb).

7. There is, at present, no evidence that horses were used for riding or as draught or pack-animals at this early period.

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The Punched Feature Card in Archæological Recording

by COLIN PLATT

There are three first essentials in the design of a successful archaeological recording system—accuracy, ease of operation and speed. Yet although these qualities are widely recognised and often successfully achieved, attention is seldom paid to a fourth—that is, the accurate sorting and classification of the material actually on the site as an aid to the preparation of the final report. It is my purpose to demonstrate that the use of punched feature cards, without adding in any material way to the labour of recording on the site itself, meets this fourth requirement in full.

It is clear that if pottery, artifacts or other small finds are emerging on a site in considerable quantity, the first essential in maintaining some sort of control in the recording is the organization of an index and cross-reference system. It is equally clear that the more comprehensive the cross-reference cover, the more efficient that system must ultimately prove. In practice, cross-referencing on the site has almost invariably shown itself to be an impossible ideal. At best, it has amounted to no more than the completion of two or three index cards for separate indexes of the conventional kind; at worst, cross-referencing may have had to be abandoned in favour of a single finds-book in which no more than a rough columnar classification is achieved. In both cases the real labour of sorting and analysis of the material has been reserved for the end of the digging season—a postponement frequently extended to months: sometimes, indeed, to years.

Now in the preparation of the final report certain features of every object recovered have their particular importance. These are the features normally recorded after the description of each object entered in the finds-book—that is, position on the site, depth or layer, relationship to any part of a building, a hearth or another object, a suggestion of date or type of ware, etc. Clearly, these features are not peculiar to one object alone but are common, on the contrary, to many. The cross-relationships of one object to another, of both to a layer, of many to a particular area on the site, are the material of which the main conclusions of the report are made. Hence adequate classification is not a simple matter of placing pottery with pottery, bone with bone, metal objects with others of their kind, but rather a fully comprehensive understanding of the

relationship of bone to pottery, of bronze fragments to all associated finds, and of every object recovered to its layer and its context on the site. For such a purpose a simple card index, though itself an advance on the old-style finds-book, is totally inadequate. To replace it a system must somehow be devised that, with the minimum of time and of re-writing, sorts-out, classifies, and fully relates our information for us. A punched-feature-card system would seem to do just that.

For some years now punched-feature-cards have been widely used in industry and in commerce, particularly in the recording of sales and the classification of personnel. The feature card differs from the conventional punch card in that it does not itself refer to a unit, but merely to an *aspect* of that unit: an aspect, that is, that could be common to any number of individual units. In an industrial concern the unit might be, for example, a single employee. Aspects of that employee's affairs that might be of interest to the firm could be the general location of his home, the scale of his insurance contributions, his willingness to work overtime, etc. In a punched-feature-card system the employee would be given a number though not a card, and that number would be punched on all those cards to which his particular qualities applied.

Naturally, as the function of the feature card differs from that of the conventional punch card, so must its design and general appearance. On each card are printed a thousand or more numbers, divided into blocks of a hundred. On the top of the card, and to the side, space is left for a short description, annotated and qualified if necessary, of the feature to which the card refers. Cards of different colours carry the series through to 50,000. The makers of the cards themselves supply hand-punches and a variety of quick-reference storage units.

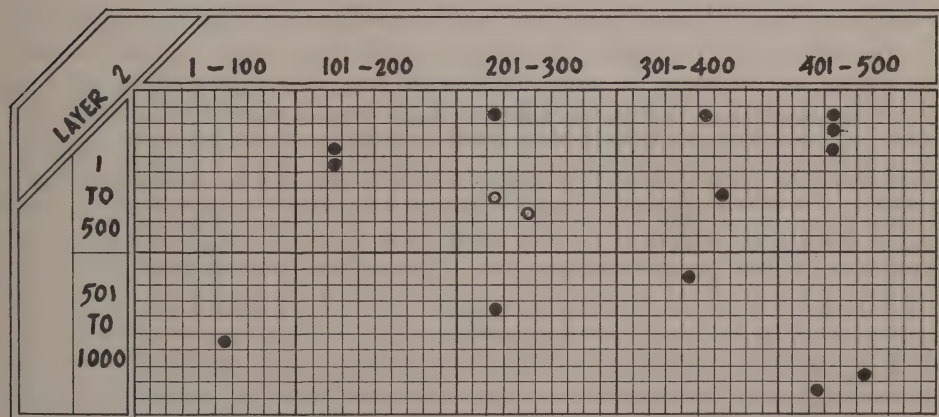
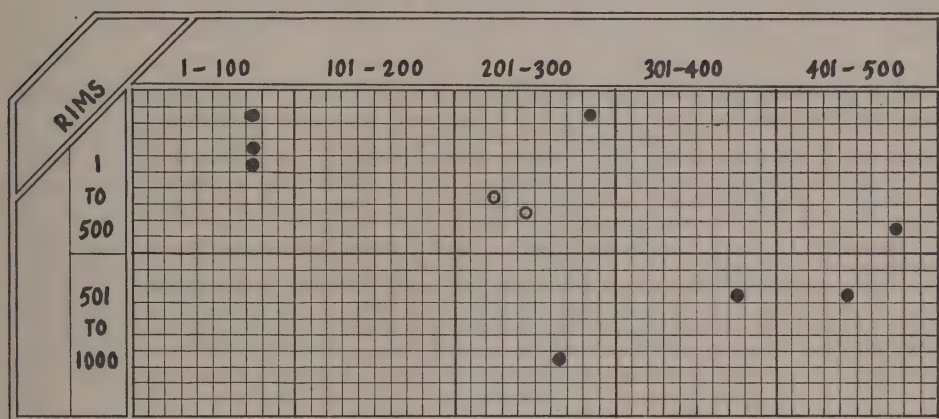
In effect, the same problems that face the personnel manager in industry confront, both on the site and at home, the archaeological recorder. For him, however, the unit is not the employee but the excavated object, and the qualities of that object are its context on the site and its relationship to other objects both of like and differing kinds. In archaeological recording, as in industry, it is the number of features common to the individual units that make classification feasible. It is also the very possession of qualities common to many that yields for each unit its peculiar value.

Clearly, there are several different planes upon which such relationships might operate. In the first place, a quality common to a number of objects might be a certain position on the site; in the second, the same might apply with respect to a particular layer. Then, if pottery is to be classified, the type of ware might be significant, as also the nature of each sherd—whether, for example, it formed part of a rim or a base, or showed any signs of incised or

PUNCHED FEATURE CARD IN ARCHÆOLOGICAL RECORDING

painted decoration. In a properly organized cross-reference system all such relationships should be recorded wherever and however they occur on the site.

Naturally, the completion of a whole series of reference cards for each object, even were it restricted to the most important, would impose an impos-



A Diagrammatic Representation of the Punched Feature Card.

sible burden on the recording staff. Moreover, any such limitation of adequate cross-referencing to 'important' material assumes that such importance can be recognised *before* a study of the whole bulk of the material has taken place. Ideally, therefore, the accuracy of the final report depends on the adequate

cross-referencing of the qualities of every fragment of excavated material—in short, a classification of a vast complex of inter-relationships that only a revolution in recording methods could be expected to achieve.

The punched-feature-card, by reducing writing to a minimum, not only speeds-up the process of indexing, but also improves its accuracy. With other cards each referring to a particular feature or aspect of the object to be recorded, it constitutes, in effect, an index to the finds-book. In practice, a feature card is provided for every column of the conventional finds-book; nor is there any limit to the number of further categories and sub-headings that may be introduced as the work progresses. The accessions number of each object recorded in the finds-book is itself the reference number of that object in the feature-card system. That is, that number among the thousand already printed on the feature card is punched out on every card to the theme or description of which the qualities of the object apply. To record, for example, a buff-ware rim, numbered 351 in the finds-book, that came out of layer A2 and was associated with the hearth in grid square XXV, the number 351 should be punched on the cards already prepared for 'rims', for 'buff-ware', for 'layer A2', for 'associated with hearth', and for 'grid square XXV'. If there are no cards ready for one or more of these features it is a simple matter to prepare a new card for each feature that has not as yet been encountered in the process of recording. Now, if in analysing the finds it should be necessary to compare all the buff-ware rims from layer A2, all that needs to be done is to hold together the cards for 'buff-ware', 'rims', and 'layer A2'. Amongst others, the hole where the number 351 had been punched out would show through all three cards. If, however, only those rims were of interest that came from the same layer in grid square XXV, the card for 'grid square XXV' would have to be added to the others. Again 351, and a somewhat lesser quantity of other holes would show right through the four cards. But if, to be even more precise, it were only the buff-ware rims from layer A2 *associated with the hearth* in square XXV that were of any importance, the card for 'associated with the hearth' might be added to the rest, and the reference would still be given back to 351 and, possibly, to one or two other numbers in the finds-book. Perhaps, in discussing the wares found on the site, a section in the report might be devoted to 'buff-wares' as a whole: the card for 'buff-ware' would supply all the necessary references. Similarly, an analysis of the contents of a particular layer could be achieved, without any possibility of missing an item, by simply referring back to the finds-book from the card of that same layer. To discuss all the finds from a single area of the site or a particular grid square, or to assemble the objects associated with a special feature, no more need be done than to select the cards relating specifically to those areas or features.

A punched-feature-card system performs, therefore, a dual function. In the discussion of the general features of the site, in its dating and in the analysis of the finds, the system provides a complete, cross-referenced tabulation of the material excavated. In the examination of particular aspects of that material and special characteristics of the site—for example, the layer series or the significance of a structure or hearth—the cards may be used as a simple index referring straight back to the entries in the finds-book, or directly to the bagged and numbered finds.

It is clear that whereas a punched-feature-card system permits the utmost flexibility in recording, the standardized headings of the conventional finds-book limit such flexibility to a very considerable degree. No doubt such headings have their point in directing the attention of an untrained recording staff to the minimum information required for each object. But considerations of sheer bulk and manageability ensure that it is seldom more than this minimum of information that is recorded. Many archaeologists in these circumstances prefer to rely on the somewhat disorganized form of the site note-book to make up the deficiencies of the finds-book itself. In a feature card system, however, it is obvious that the greater the amount of information recorded in the finds-book, the more numerous will be the cards punched for each object listed there; hence the more adequate the cross-reference cover. With this in mind, I have found it necessary in operating a feature-card system to abandon the form of the conventional finds-book, replacing it with a duplicate ticket-book of the kind that may be obtained from any business stationer. On each ticket the standard details of position, depth and nature of the object are amplified with any information, however miscellaneous in character, that might be of interest in the final analysis of the material from the site. The duplicate ticket is then torn-out and is inserted with the object in its numbered bag. As soon as possible after this, to avoid a tiresome accumulation of work, the relevant cards are punched for the day's finds, the bags are stapled-up, and the system is thereby completed. The use of duplicate tickets ensures that no two objects could, by any recording error, acquire the same number, and a combination of the bagged tickets, the tickets remaining in the finds-book, and the information stored in the punched-feature-cards, renders it totally unnecessary to write anything more than the accessions number on the outside of each bag.

Naturally, a new system, whatever its virtues, may be open to valid objection, and it would be rash, even impertinent, to insist that a punched-feature-card system has any more than a marginal advantage over many recording systems currently, and successfully, in use. However, the most cogent point in favour of the use of feature-cards in archaeological recording is that, whatever the objections to their employment as part of any one recording system, feature

cards, properly used, provide a cross-referenced index of unequalled simplicity and efficiency. Considered as an index pure and simple, the feature card may be used in all except the most minor of excavations. Clearly, in a very large, or particularly rich, excavation it would quickly become impossible to deal individually with every object recovered. But as the number of finds increases so does the desirability of indexing those finds, however they may be grouped. As circumstances vary so much from one excavation to another, I have attempted merely to outline a system by which the feature card might profitably be employed. The details of the system and the elaboration of its working depend solely on the quantity of information it is desirable in each case to store and to recover. Feature cards as a method of archaeological recording are young and relatively undeveloped, and as yet no 'classical' usage has established the lines of future growth. It is for this reason that my object here can be no more than to bring to the attention of other archaeologists an index and cross-reference system that already, in my own experience, has shown revolutionary implications for archaeological recording in the field.

ACKNOWLEDGEMENTS

I owe special thanks and acknowledgements to Miss Joan du Plat Taylor, of the Institute of Archaeology, London, for a first introduction to punched feature cards, to Mr. J. L. Jolley, of J. L. Jolley and Partners Ltd., Great Missenden, Bucks., for advice on their use, and to the manufacturers, Messrs. Carter-Parratt Ltd. of Sutton, for permission to discuss their product.

Note on an Egyptian Statuette: Brit. Mus. 1735

by H. M. STEWART

In a previous article concerning a type of Egyptian funerary statuette shown in an attitude of worship, an example in the British Museum¹ was cited, which appeared to represent the earliest stage of its development.

Additional interest attaches to the fact, hitherto unrecorded, that this private monument has inscribed on it a hymn from the temple liturgy of Amen-Re.² Although a similar origin seems inherently probable in the cases of other funerary hymns, especially as tomb-owners were often priests, well-authenticated instances of such borrowings are rare³. Paralleling the present text, and possibly contemporary with it, two fragments on ostraca⁴ from Theban tomb No. 71 of Senenmut (*temp.* Hatshepsut) are also known, these three copies being some six centuries earlier than the temple manuscript, which dates to the Twenty-second Dynasty. In the former the hymn is addressed to Amun, and makes no direct mention of his assimilation to Re. The later version, except for the use of the compound name at one point, is virtually identical.

It is hoped that the following translation of the statuette's inscription, aided by the parallels, will usefully supplement the original publication, in which the abraded condition of the monument presented difficulty.

‘The king’s chancellor and overseer of the treasury, Sennetjer, justified, says: I have come⁵ to thee, most virile of the gods, Amun, primeval one of the Two Lands, upraised of arm,⁶ lord of the double plumes and the crown⁷ (which are upon) thy head. King of the gods, pre-eminent in Karnak, hidden image, enduring in all things in this thy name⁸ of Amun. Greatest power of all the gods; they (do not) remove their backs from thee⁹ (in) their (name) of Divine Ennead.’

¹ Stewart, 'Egyptian Funerary Statuettes and the Solar Cult' in *Bulletin of the Institute of Archaeology* IV (1964), 165–70 pl. 12 (1).

Edwards, *Hierogl. Texts*, VIII (Brit. Mus., 1939), 51, pl. 43.

² *Hieratische Papyrus aus den königlichen Museen zu Berlin*, I: 'Ritual für den Kultus des Amon' (1896), pl. 6, lines 3 ff.

Moret, *Le rituel du culte divin journalier* (Paris, 1902), 67 f.

³ For fuller discussion and comparative texts see the next issue of the *Bulletin*.

⁴ Hayes, *Ostraka and Name Stones* (New York, 1942), 18, pl. 10 (Nos. 48–9).

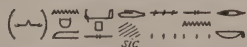
⁵ The Berlin papyrus has 'The pharaoh has come.'

⁶ Ref. to the god's conventional pose.

⁷ Berlin pap.: *wrrt* (in full), not *wrt*(*y*) ('great') as applied to 'plumed'.

⁸ Probably *rn.k* as in Berlin pap. rather than *ir.n.k*.

⁹ Following the parallels, the published text should most probably be amended to read:



The negative, apparently lacking on the statuette, occurs in the Berlin pap. and in Hayes' No. 49 (48 having a lacuna). Presumable meaning: 'they remain prostrate before thee.' The somewhat contrived air of the original expression suggests a pun between *psd* ('back') and *Psdt* ('Ennead'), paralleling that between *imn* ('hidden') and Amun in the previous sentence. Such artifices are common in Egyptian poetry.

A Survey of the Tabernas Material lodged in the Museum of Almeria

by C. TOPP and A. ARRIBAS

The name of Tabernas is already well-known in archaeological literature in connection with the local megalithic tombs (Leisner's Group 32).¹ But this paper is not concerned with them nor with the objects recovered therefrom and now in the Museo Arqueológico Nacional of Madrid.² It is solely concerned with Tabernas as a habitation-site and in particular with the small assemblage of objects from the site at present housed in the museum of Almería. This collection consists of the finds made by the late Juan Cuadrado Ruiz during his excavations around 1950. It has recently been briefly discussed by one of the writers in connection with possible Danubian influences in these regions during the Chalcolithic period.³ In 1951 the site was further excavated under the direction of Professor Santa Olalla and a vast quantity of material removed to Madrid. Examination and publication of this material would certainly add enormously to our understanding of the site, especially since some evidence of stratigraphy has been recorded by the later excavators.⁴ The present writers have not had access to any of Cuadrado's excavation records (should any such exist) and they are well aware of the limited scope of this article, based on a fractional portion of finds from the site. But it still seemed worthwhile listing and examining this material which at present lies virtually unknown in a remote provincial museum of southern Spain.

The modern village of Tabernas lies some 30 kilometres to the north of the city of Almería on the main road to Murcia. It is cradled between the sierras of Gador and Alhamilla and the sierra of Filabres rises nearby to the north. The chalcolithic habitation-site is 1500 metres south of the modern village and is known as Terrera Ventura (which name it takes from the farmhouse adjacent to the prehistoric settlement). This latter is a tall mound some 500 metres long

¹ G. and V. Leisner, 'Die Megalithgraber der Iberischen Halbinsel', *Römische-germanische Forschungen*, 17 (Berlin, 1943), I, 73-77.

² Leisner, *ibid.*, Plates 2, 29, 30, 33 and 34.

³ C. Topp, 'Some Possible Balkan and Danubian Influences in Southern and Eastern Spain', *Archivo de Prehistoria Levantina*, VIII, (1960) pp. 115-125.

⁴ Leisner, 'Antas do Concelho de Reguengos de Monsaraz' (Inst. para a Alta Cultura, Lisbon, 1950), 83, fn. 160. The authors state that Santa Olalla informed them that painted pottery occurred in the lowest level of Tabernas, below Beakers.

and about 100 metres above the level of the ravine of Tabernas. In aspect it greatly resembles the mounds of similar habitation-sites within the same province of Almería, such as El Garcel, Tres Cabezos, El Argar, etc., all of which lie within a radius of 60 kms. Like them it is a hill-top site, well defended on the N.W. by a river-gorge and a steep precipice. It could very easily have been made into a fortified village like Los Millares and future excavation may well reveal masonry walls such as exist on that latter site⁵. The river Los Molinos would have provided a water-supply augmented by wells during the dry period. Some stone-lined pits, excavated in the surface of the plateau have been interpreted as silos but could equally well have served as water reservoirs.

The Tabernas material in Almería museum is listed below under the following headings: metal, possible ritual objects, stone and flint, bone, clay and pottery, shell, animal and vegetable remains.

I. Metal

The metal objects comprise only a flat axe (no. 33) with slightly splayed cutting edge, of rectangular section, measuring 9.2 by 4 by 0.2 cm. There are also four fragmentary quadrangular awls (no. 34) of the same metal (?) and a lump of oxidised copper slag. This last was found on analysis to consist of pottery (probably the base of a broken crucible) with adhering slag. This latter is partly crystalline, partly glassy and composed of silicates with much cuprous oxide which have become malachite through secondary oxidation, hydration and carbonisation.

These objects provide the only evidence of the smelting and use of metal at present known from the site. They enable us to place Tabernas in a chalcolithic context and to imply a local knowledge and practice of metallurgy. The metal requirements of the inhabitants could thus be met at first hand from local sources and they did not have to rely solely on imported metal products.

II. Possible Ritual Objects

These consist of schematized idols of various shapes and materials, phalange idols, clay phalli, cylinders and plaques and a possible votive small stone adze.

Among the first is a clay feminine statuette (no. 1), 8 cm. high, with breasts in relief, of cylindrical shape with a strangulation indicating the neck and a horizontal perforation in the shoulder region. A somewhat similar figurine, also of baked clay and perforated, is conical and has horizontal lines incised on both its surfaces. Yet another clay figurine, of pseudo-rectangular section and more finely smoothed than the above, lacks the transverse perforation. There are three conical alabaster idols (nos. 2 and 3) one with the neck region indicated

⁵ Almagro and A. Arribas, 'El Poblado y la Necropolis Megalíticas de Los Millares', *Bibliotheca Praehistorica Hispana* III (Madrid 1963).

and another with two incised lines on one surface. This series is completed by a very few round pieces of bone (nos. 7 and 8), well polished and bevelled, with a marked indentation representing the neck of a schematized human form. One of them bears an incised line. The height of all the above objects varies between 8 and 3 cm.

The phalange idols (nos. 9 to 15) number 37 and vary between 8 and 1.5 cm. in overall length. Some are burnt and a few appear stained, possibly accidentally, though the brown colour may represent traces of painting as in the case of those from La Pastora de Alcoy.⁶ They are nearly all polished and six of them have deeply incised lines delimiting the upper region. The largest (no. 9) of all has a triangle incised in the lower portion, somewhat like the one from Cabecico de Aguilar which is also in Almería museum.⁷ Many of these phalanges are those of pig but the authors are unable to determine whether these animals belonged to the wild or the tame species.

There are two clay phalli (nos. 4 and 5) and both have horizontal perforations below the tip, made before firing. One has an oval and the other a circular section and the larger measures 12 by 4.5 cm.

Next come 27 massive fragments of clay cylinders (nos. 6 and 17) of various sizes, of round section, well smoothed, grey or red in colour. Most of the fragments were perforated horizontally before firing and measure around 10 cm. in length.

There are 161 clay plaques (nos. 18 to 27) and fragments of the same, one of which is decorated. Their purpose is unknown despite their frequent appearance on Iberian sites; they occur in vast numbers at Vila Nova de San Pedro and Do Paço cites a comprehensive bibliography for them.⁸ Since the Tabernas ones show no signs of use inside the perforations and therefore cannot have served as loom-weights they are listed among the possible ritual objects for want of a better heading.

The decorated plaque (no. 18) is of baked clay, unperforated, dark grey in colour and poorly fired, smoothed, of quadrangular section and measuring 6 by 4 by 0.8 cm. The pattern on one face consists of incised inclined parallel lines crossed by three horizontal ones. The other surface has an incised horizontal line crossed by strokes coming from both edges forming large irregular triangles with the first. These plaques are not uncommon in Iberian contexts.

⁶ I. Ballester Tormo: 'Ídolos oculados valencianos', *Archivo de Prehistoria Levantina*, II (Valencia, 1945), 1946.

⁷ A. Arribas: 'El sepulcro megalítico del Cabecico de Aguilar de Cuartillas (Mojácar, Almería)', *Ampurias* XVII-XVIII (Barcelona, 1955-56), 210-24, fig. 5, no. 14.

⁸ E. Jalhay and A. Do Paço: 'El Castro de Vilanova de San Pedro', *Actas y Memorias de la Soc. Española de Antropología Etnografía y Prehistoria*, XX (Madrid, 1945), 63.

There is a very similar one of sandstone from Cova de la Mora now in Seville Archaeological Museum and many clay perforated ones from Vila Nova, etc., An interesting instance of the possible ritual nature of such plaques is provided

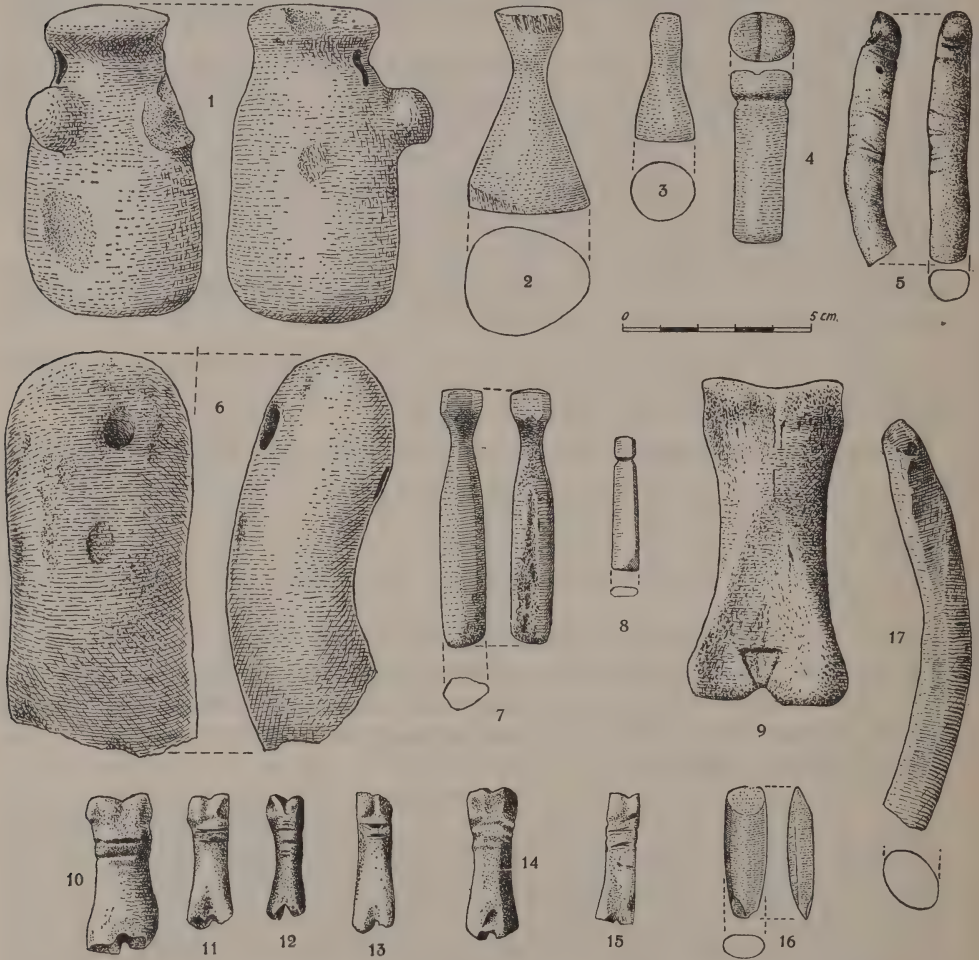


FIGURE 1 Ritual Objects from Tabernas

by one recently found in tomb XI at Los Millares (the new numbering adopted by Almagro and Arribas as opposed to Siret's). Here an undecorated perforated clay plaque was found by both the present writers under the artificial floor of the passage entrance.

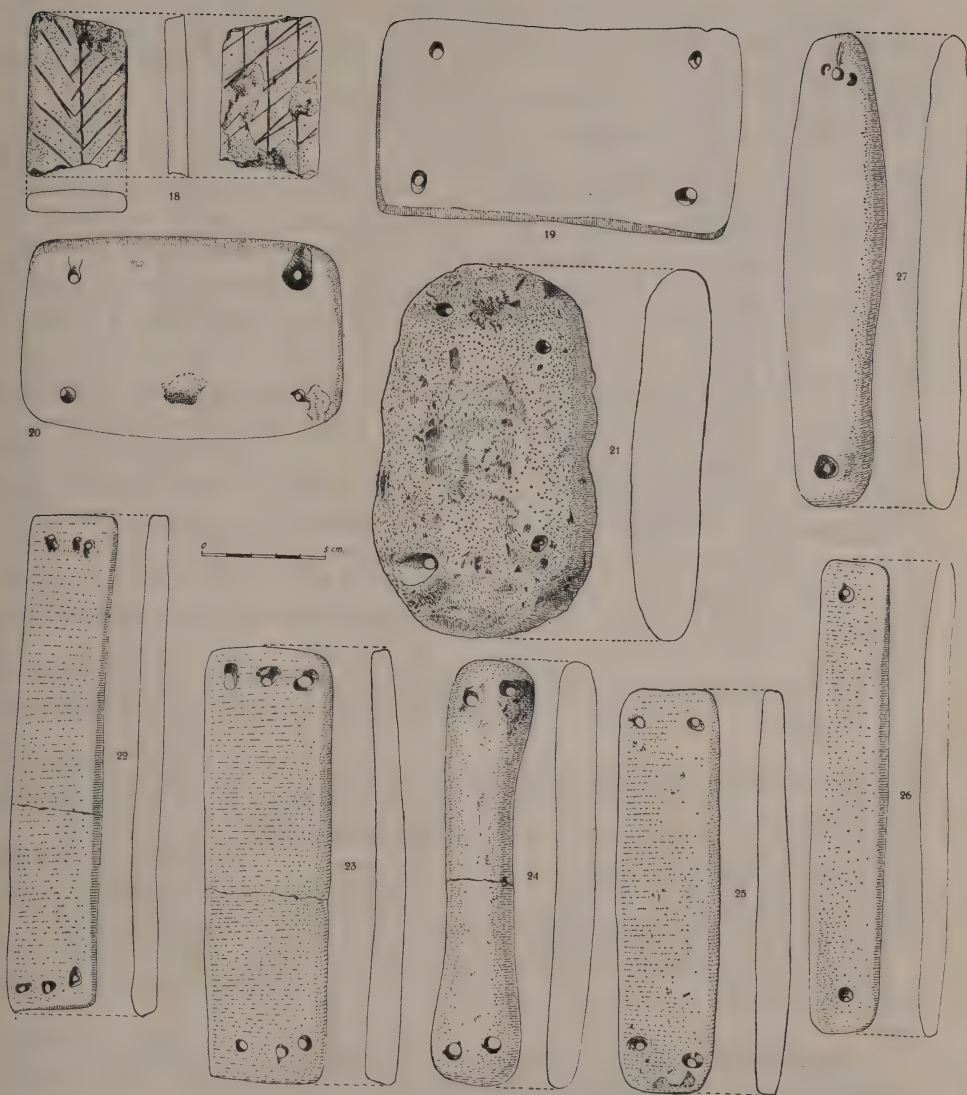


FIGURE 2 Clay Plaques from Tabernas

The rest of the clay plaques were all perforated before firing; some have two, some four and some six perforations. They vary in size, shape and section: the largest measure 14 by 9 by 3 cm. and 20 by 3.5 by 0.9 cm. respectively and some have a rectangular and others an oval section.

Finally there is a miniature adze of kyanite (no. 16) with bevelled sides; one face of the cutting edge has been treated in the same manner. It is very well polished although retaining some traces of cortex on one face. The section is oval and the object measures 3.3 by 1 cm. The authors are not in agreement as to the ritual nature of this object: Arribas considers it to be votive but Topp holds that it may well have been a tool used for delicate work since many similar small ones occur on Iberian sites (e.g. at Vila Nova de San Pedro).⁹

III. Stone and Flint

There is a very large number of tools (nos. 35 to 41) mostly made of polished igneous rocks. They comprise 7 chisels (one of which proved by analysis to be of hornblende schist), 8 broken axeheads with a groove for hafting and 78 axes and adzes, some broken, of flat, oval and round sections. One of these was also petrographically examined and found to be of nephrite; and another (no. 39) is of a most unusual type. It is an adze of gabbro, of triangular section, with grooves for hafting. There are also 2 hammers, 4 discs which look like quern-rubbers, a broken sandstone spindle-whorl (no. 120) and an amorphous fragment.

The flint material (nos. 42 to 59) consists of a lancehead, 7 arrowheads, an awl, 14 scrapers, 118 blades, 3 large flakes and 69 amorphous and unworked ones.

The lancehead (no. 42) is of honey-coloured flint with some inclusions; the cortex has not been entirely removed. It is finely worked bifacially with marginal retouches invading both faces; the tip is broken.

Three of the arrowheads (nos. 43 to 46) are also worked bifacially and the the rest have marginal and terminal retouching. They vary in size and in shape, two being triangular and tanged and barbed and two lozenge-shaped.

The awl (no. 48) is of a poor quality honey-coloured flint flake; its sides have been thinned by marginal retouching and it has a double terminal perforation.

The scrapers include a double-ended one without any secondary working, 4 end ones and a core with good step-flaking retouch. There is also a hollow scraper made from a flake which implies woodworking.

92 of the blades have marginal retouches and the remaining 26 are unworked but most of them show marks of use.

⁹ *ibid.*, p. 22 and Pls. VII and VIII.

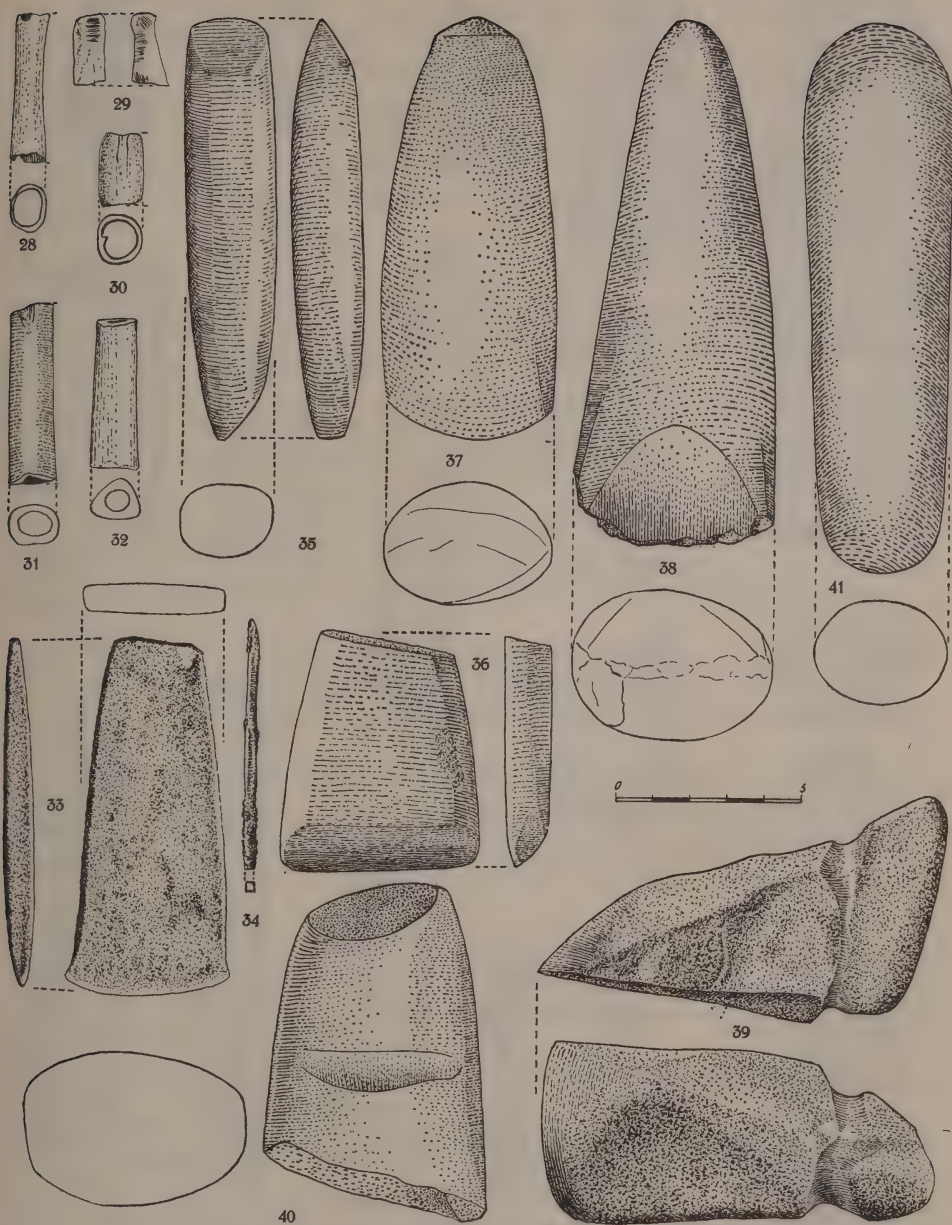


FIGURE 3 Bone Fragments, Metal and Stone Tools from Tabernas.

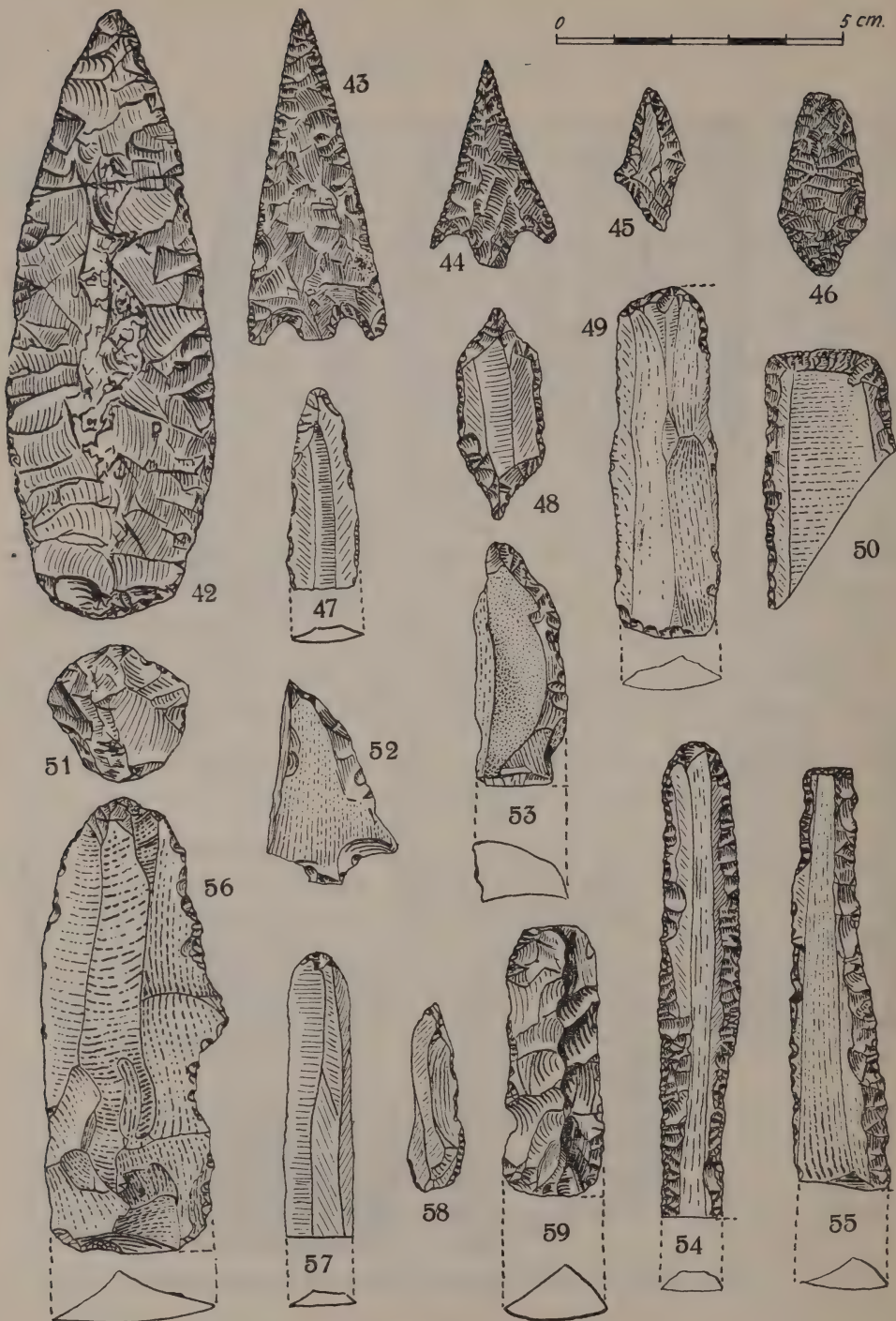


FIGURE 4 Flint Artifacts from Tabernas

The 3 large flakes are triangular in section and have a sinuous profile. They have heavy secondary retouches running from the shoulder to the base (no. 59).

Finally we might include here 4 amorphous flakes of quartz and one of rock crystal, 5 fragments of quartz and one of rock crystal, another of pink rock crystal (very highly polished), 1 of limonite, 1 of quartzite and another of polished limestone. There are also 4 flakes of red flint, cornaline and chalcedony, a small piece of granite with a probably natural perforation, 2 river pebbles and 9 fossils.

IV. Bone

The bone material comprises a comb, 140 points and fragments of the same, spatulae and hollow pieces which may have been part of a necklace. Most of these objects are highly polished and many are burnt.

The fragment of comb is pointed at one end and shows the remains of five teeth at the other. It was probably used to decorate pottery: the teeth fitted the decoration of the Beaker sherds and that of no. 73 and it might well have been the instrument used to make the patterns.

The points (nos. 60 to 66) are of the usual type and vary only in size. They are mostly made out of ulnas and metapodials of sheep or goat; a much larger one has an irregular notch on either side (no. 61). Many of them could also have served as polishers.

The polishers proper number 51 and are mostly ribs. 4 of them are very burnt and were highly polished subsequently to the burning (no. 67).

There are only 2 broken spatulae (no. 68) both of which are highly polished on one face only.

Finally there are 9 hollow pieces of bone (nos. 28 to 32), two of which are small phalanges and two others are tiny fragments of long bones of birds. Some are burnt and highly polished and they might have been used for personal adornment though the fractured ends of the bird bones are sharp.

V. Clay and Pottery

Apart from the plaques and figurines already described the only clay object which is not a pot or part of one is a spindle-whorl with smoothed edges (no. 119), of well-fired micaceous clay of reddish hue. There is also a ladle which is described below among the pottery.

The pottery can be divided into 1. *Decorated* (a. painted, b. Beaker, c. other); and 2. *Undecorated*.

1a. There is only one sherd (no. 69) of painted pottery and it is quite unlike any other known to the writers. It is a large sherd of the lower portion and concave base of a tall pot with slightly incurving sides, of grey micaceous clay, scaly in texture, unevenly fired and tempered with coarse grits of quartz and schist. The reddish background and linear patterns were painted on the outer surface before firing and subsequently burnished.

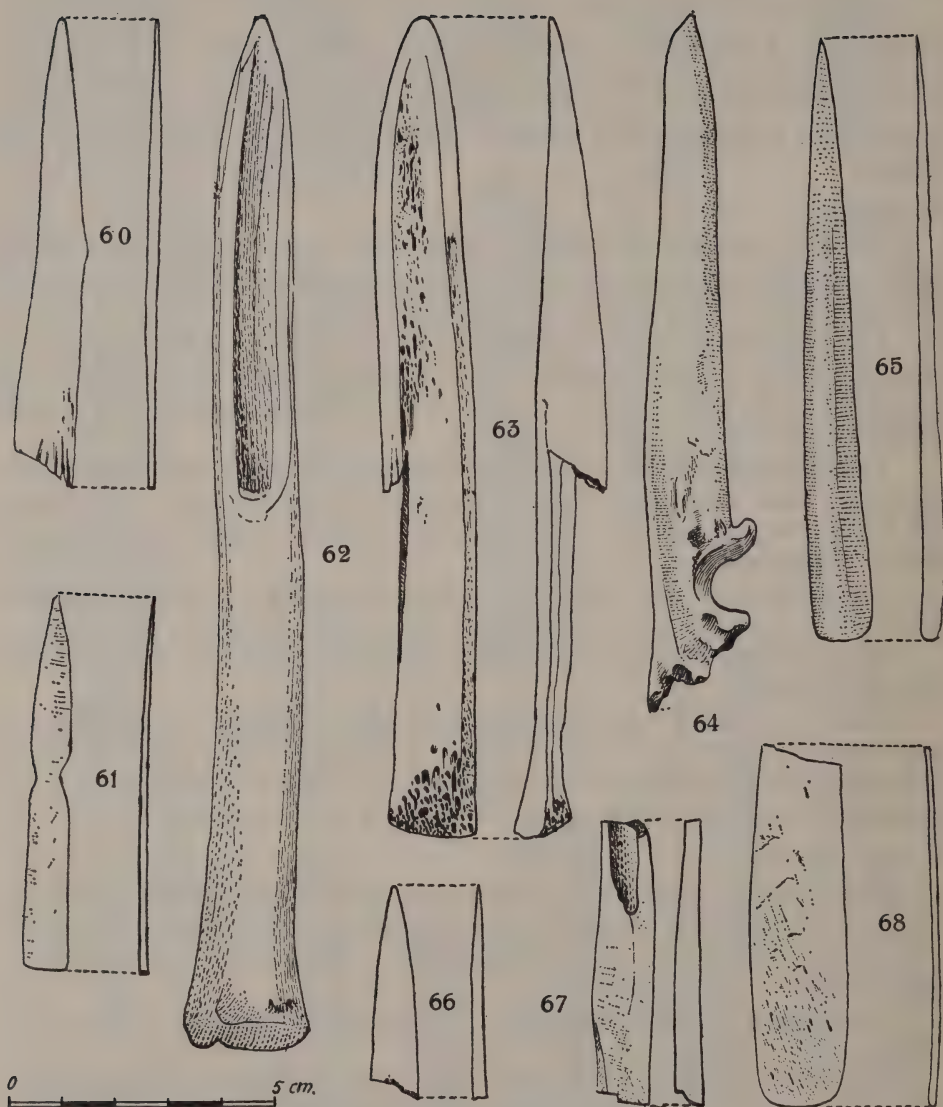


FIGURE 5 Bone Tools from Tabernas

The pattern consists of a band of broken red parallel lines. Beneath this are five bands of red lines forming chevrons and below these is a lozenge. A nipple lug interrupts the first four lines of chevrons and was obviously part of the pot before the pattern. The inner surface is undecorated and unsmoothed and there are numerous black patches on the sherd caused by fire.



FIGURE 6 Painted Potsherd from Tabernas (1 : 2)

1b. A fragment of typical beaker ware (no. 70) of grey micaceous clay fired uniformly red with smoothed surfaces. The outer is decorated with three inclined short incised lines which run in opposite directions; below are two parallel incised lines. The pattern was executed with a sharp point.

Another beaker fragment (no. 71), greyish-black in colour, with unsmoothed surfaces, darker within than without. The exterior is decorated with nine parallel bands made by a rectangular-toothed comb. The last five bands are interrupted by a plain triangle formed by incised lines and the beginning of another is just visible. On the inner surface are two deeply incised lines also comb-made.

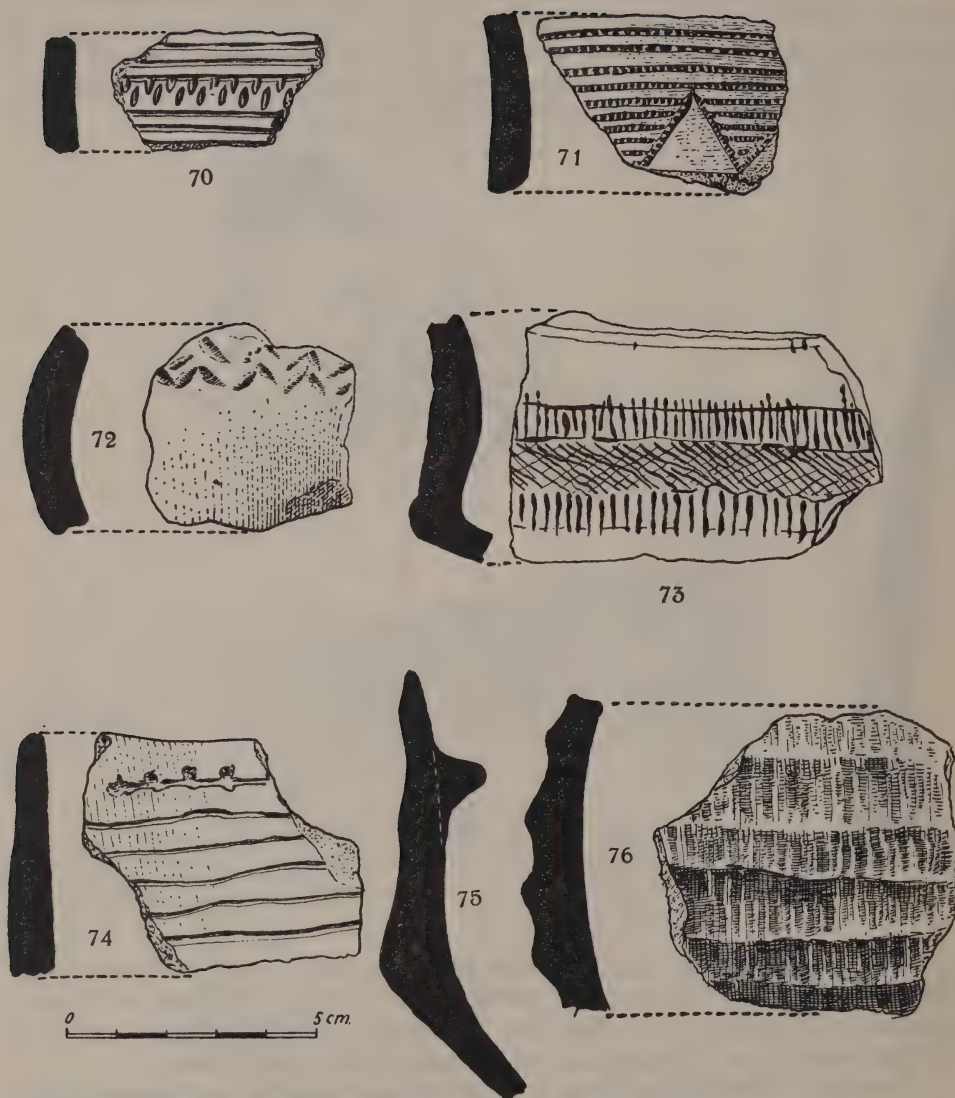


FIGURE 7 Beaker and Decorated Sherds from Tabernas

1c. Base fragment (no. 72) of a small pot of dark-grey micaceous clay, well fired, with paste of scaly texture tempered with large grits of crushed quartz and schist. The surfaces are unsmoothed and the pattern consists of two bands of incised chevrons.

Body fragment (no. 73) of similar ware but without the large grits. The inner surface finely burnished, the outer rougher. The comb-made decoration consists of bands, the upper narrow one executed with a small wide-toothed comb. Below this is a plain wide band and beneath it another of short incised lines overlapping the upper delimiting line; below this is yet another band of crossed diagonal lines limited by a lightly incised one. Beneath this is another band of short vertical and parallel incised lines running over the carination.

Rim fragment (no. 74) of a pot with upcurving sides, of buff-grey micaceous clay. The inner surface is reddish and smoothed, the outer greyish and more finely smoothed. The decoration consists of six very irregularly incised parallel lines the uppermost of which is crossed by four wide vertical strokes.

11 fragments (nos. 75 and 76) of big rough pots of poorly fired red clay containing coarse grits and with much mica on the surfaces. The inner surfaces are smoothed and the outer show marks of basketry or of thick strings of vegetable weave. One of the sherds has a flattened lug somewhat inclined beneath the rim.

The texture of the paste of all these sherds is scaly and contains many grits of quartz and schist as well as mica.

2. *Undecorated.* 7 fragments of cylindrical pots of sinuous profile, of various poorly fired clays, of the usual scaly texture with tempering of quartz and mica. The outer surfaces mostly lightly smoothed but the inner rough. The walls are perforated by small holes disposed in parallel lines pierced from without before firing. These fragments are all portions of so-called cheese-strainers. There is also a finely burnished rim sherd of similar type (no. 77) and 3 unperforated fragments (one of which has numerous incomplete perforations) similar to the above 7.

A spout-fragment of a small ovoid bowl of well fired greyish clay of the usual scaly texture tempered with mica. Both surfaces dark and burnished (no. 78). A fragment of rim and spout of similar type with black patches made by firing; both surfaces red and polished (no. 79). Another similar sherd with grey surfaces and thin walls; grits of quartz as well as mica (no. 80). A whole pot of similar type to the above fragments but thicker and having a small circular receptacle at the tip; the surfaces are smoothed and reddish, the outer base blackened (no. 81).

The bowl portion (no. 82) of a small solid ladle of well fired grey clay of the usual texture tempered with mica. The surface is greyish-red and the base very chipped.

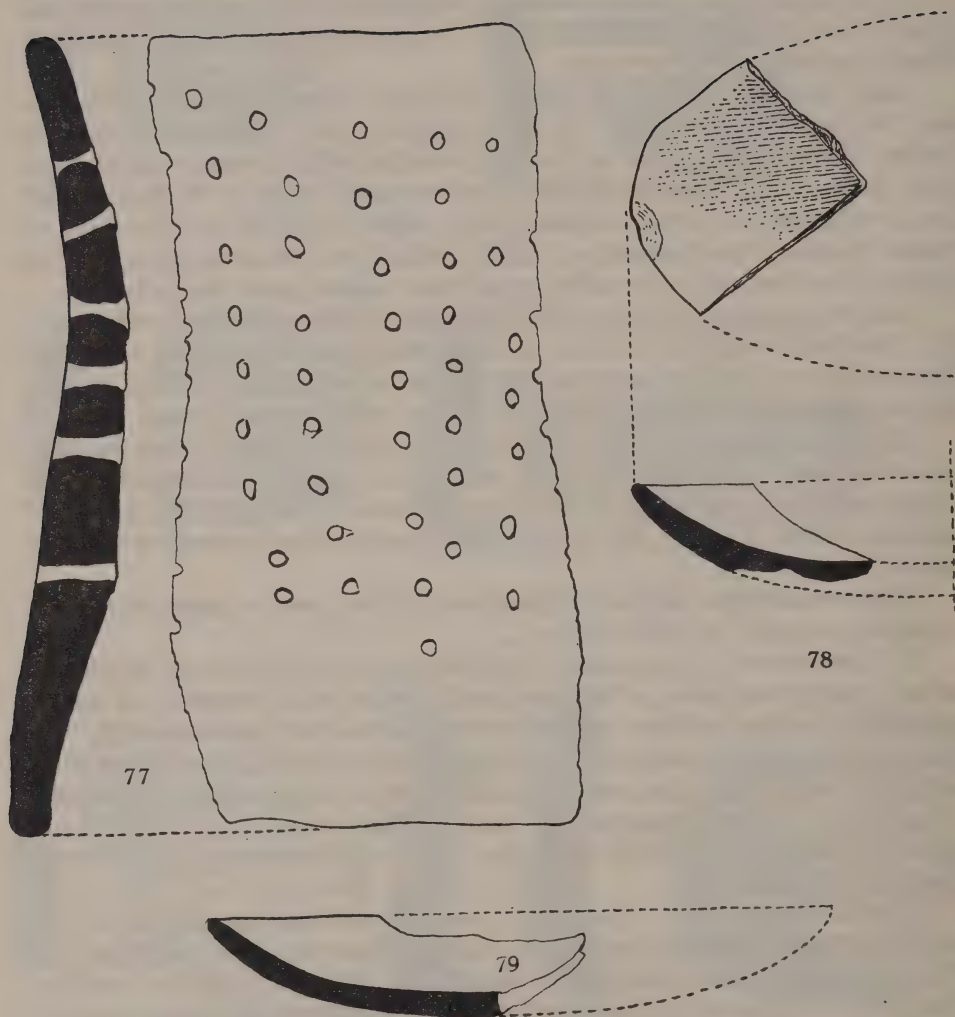


FIGURE 8 'Cheese-Strainer' and Spout Fragments from Tabernas (2:3)

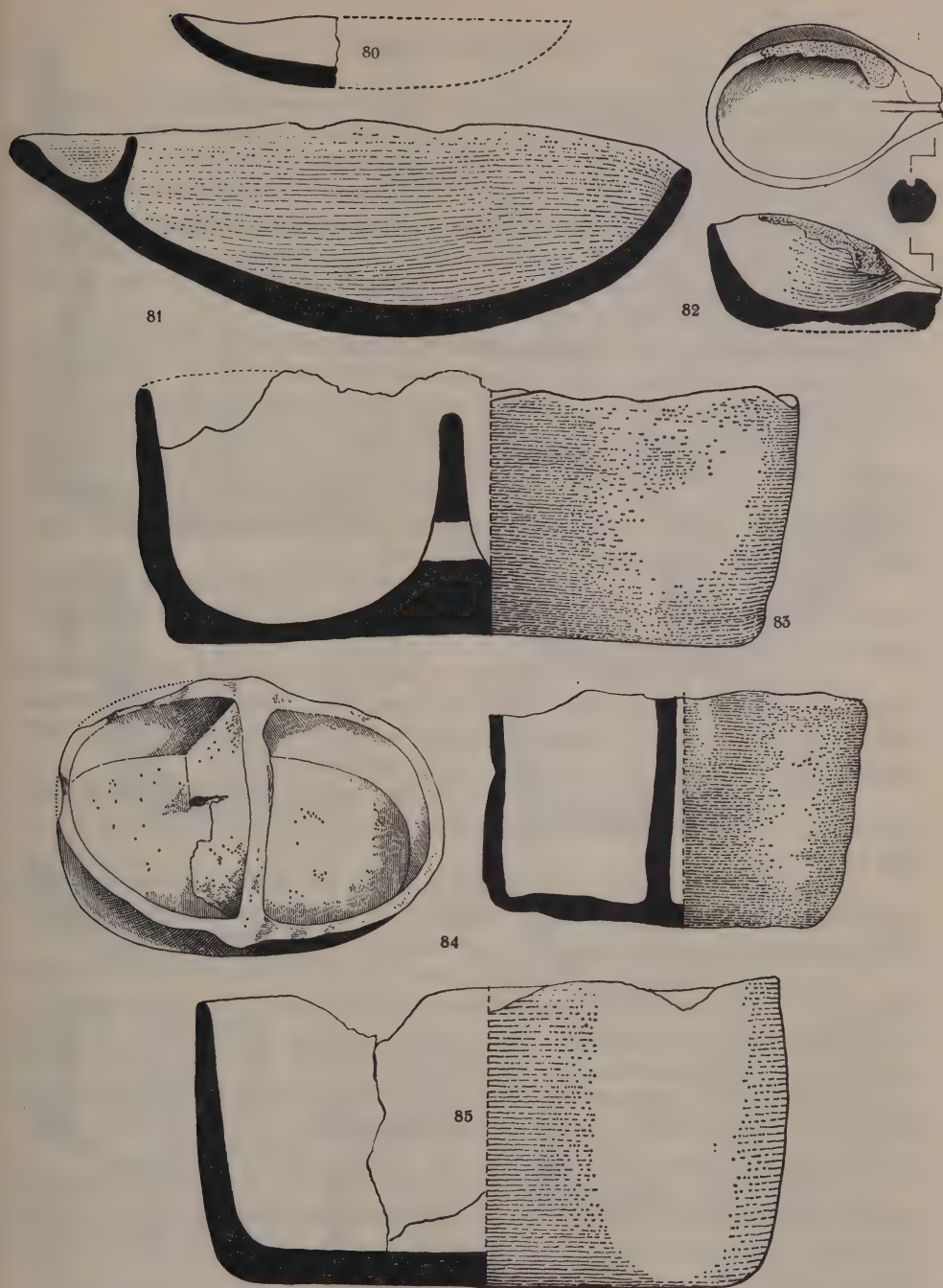


FIGURE 9 Clay Ladle and Twin-Vases from Tabernas (1 : 2)

A thick-walled pot (no. 83) made in two portions joined by a septum perforated in its lower part. Traces of a horizontal handle are visible on either side of the outer surface. The well-fired paste is greyish red, scaly in texture, with fine grits of mica and quartz. The exterior is smooth, the base flat and shaped like a figure 8 and the walls curve slightly outwards at the top.

A pot of similar type (no. 84) but smaller and rougher, not so well fired, much burnt inside, with very coarse grits of quartz and mica. The base is oval and there are also remains of two handles.

2 flat-based pots with slightly outcurving walls of poorly fired grey clay, scaly in texture, with mica grits, smoothed surfaces and traces of burning (no. 85). Another better-fired pot, grey-buff, with grits of mica and quartz (no. 86).

A small thick-walled pot (no. 87) with slightly protuberant mouth and concave base. Of well-fired grey clay floury in texture and tempered with fine mica; outer surface well burnished. Another similar pot (no. 88) with walls curving inwards at the mouth and having two perforated vertically placed lugs; the outer surface very battered and shining with mica.

1 plate (no. 89) and 4 large fragments of others of various sizes and profiles. Of well-fired grey clay, scaly in texture, with big grits of mica and quartz; the surfaces are red and rough.

A thin-walled sherd of reddish-grey clay, scaly-textured and tempered with mica and quartz (no. 90). A similar one with smoothed inner surface and rough base (no. 91). Another similar but grey and burnished on both surfaces (no. 92) and another well-smoothed buff one (no. 93).

3 bowls (nos. 94-96) of grey clay of the usual texture with much mica tempering, of parabolic and spherical shapes, with smoothed surfaces; no. 95 has a flat base.

A fragment (c. 2/5) of a flat-based pot (no. 97) with incurving walls, of poorly-fired grey clay of the usual texture with grits of quartz and mica; the outer surface is smoothed and both are reddish.

5 small and low rough cylindrical vases (nos. 98 to 102) which were either supports of others or part of the pedestal of 'fruitstands'. This last suggestion is strengthened by the fact that these pots are rimless and therefore probably originally a portion of others. One with everted sides, the majority of reddish clay fired at various temperatures. Paste of the usual scaly texture tempered with mica. All are smoothed, (especially no. 99), except no. 102 which has rough surfaces showing more mica than the rest. All are fragmentary.

A small thick-walled broken pot (no. 103) with one perforation, probably part of a twin-vase. Of dark grey clay, scaly texture and fine mica grits; surfaces black and burnished. There is also a fragment of a small bowl identical in all respects (no. 104).

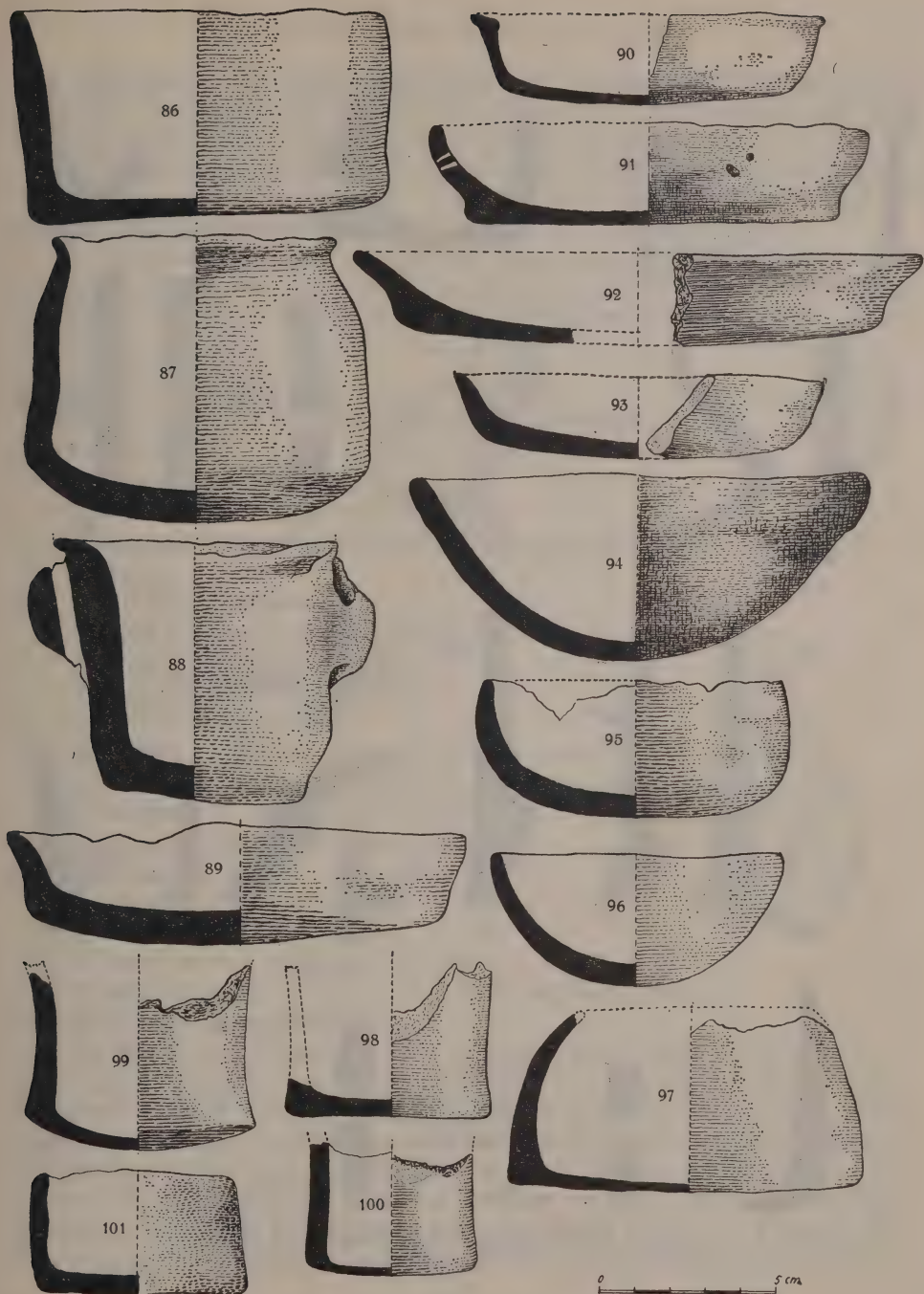


FIGURE 10 Pots, Plates, Bowls and Supports from Tabernas.

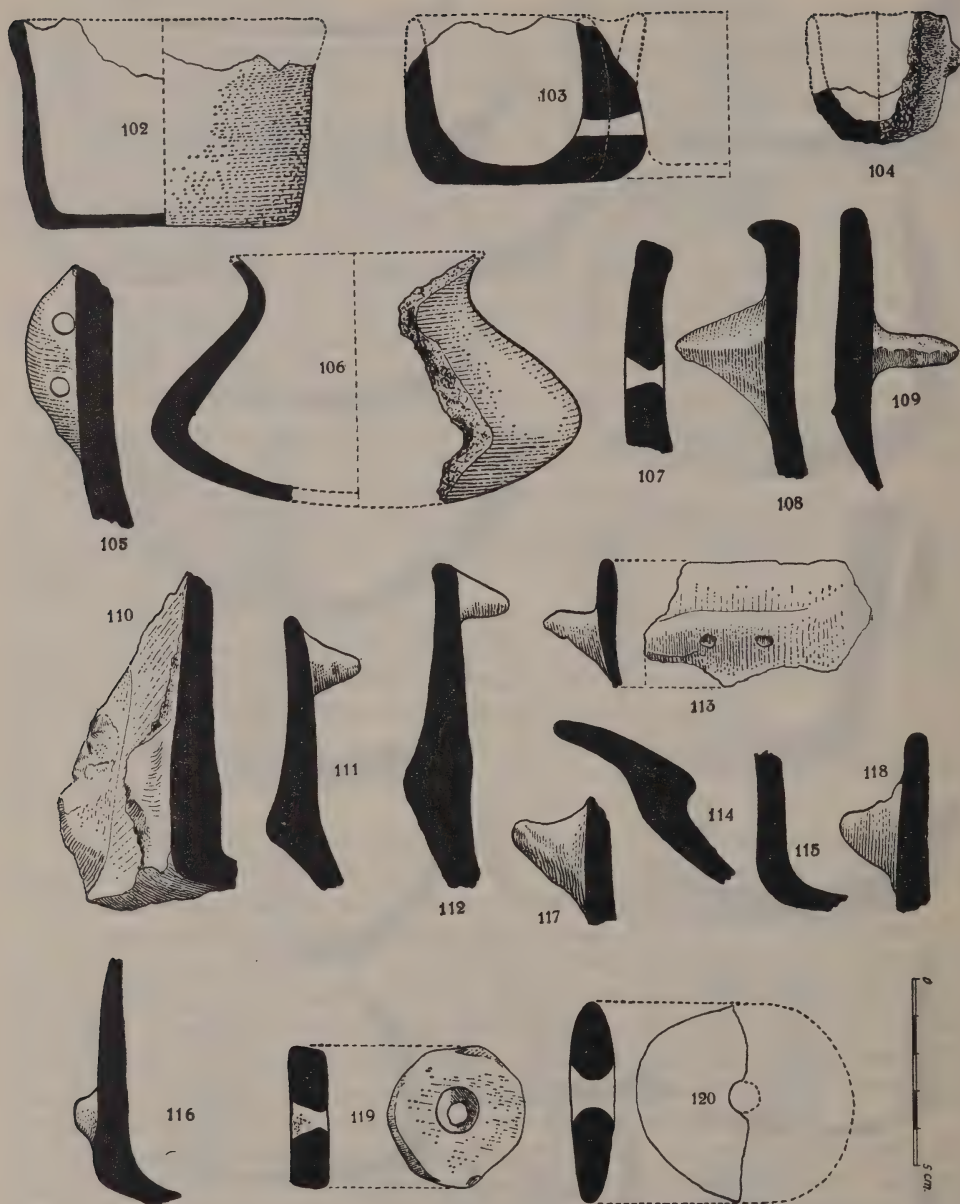


FIGURE 11 Pots, Lugs and Spindle-Whorls from Tabernas.

3 different sherds of dark grey clay similar in paste to the above (nos. 105-107). No. 105 has a horizontal lug with a double perforation and no. 107 has a repair-hole of conical shape pierced from without.

Sherd of a medium sized pot with a large flattened horizontal nipple lug. Of reddish-grey clay with paste of scaly texture tempered with mica; surfaces roughly smoothed (no. 108).

11 fragments of large and medium sized pots of reddish clay of paste similar to the above; much mica on the surfaces which have been slightly smoothed. Handles of various shapes, mostly flat horizontal lugs placed on the inside (nos. 109-118).

VI. Varia: Shell, Animal and Vegetable Remains

Shell: 8 tritons plus 1 perforated fragment of the same.

16 patellas.

2 amorphous fragments.

2 oysters.

A fragment of mother-of-pearl with two perforations made from within.

40 unios.

1 dentalium fragment.

A small fragment of the interior of a triton.

A small fragment of a patella.

2 conus with basal perforation.

3 perforated columbellas.

The numerous perforated fragments were probably used as ornaments.

Animal Bones: A fragment of epiphysis of a large femur, either ox or horse.

A footbone of ? goat with two (probably accidental) perforations.

3 metapodials of either goat or sheep.

1 metapodial of ox.

Fragments of rodent bones.

2 teeth of horse.

17 boar tusks (8 upper and 9 lower).

A burnt fragment of a long bone which might be human.

All these bones are unworked.

There are also 13 entire and broken piece of horn. These are all antlers and most are too small for reliable determination. The roundness of the tines and the absence of any pieces showing palmation is against an attribution to Dama (fallow-deer) though the evidently small size of all the antlers represented would support this species as against Cervus (red deer). The rugose surface-texture of at least one fragment makes it almost certainly red deer. One short stout snag could have belonged to Capreolus (roe) but would equally fit a young stag. The only positive indications point, therefore, to youthful red-deer antlers.

Vegetable Remains: A fragment of charred wood. This was analysed and proved to be the wood of a conifer (not *Pinus*). Some splinters of uncharred wood were found but, due to impregnation with mineral salts and the distortion of the tissues, the analyst was unable to comment on them. Resin ducts were not seen.

A small box of grain was also analysed and proved to be *Triticum* sp. (wheat).

DISCUSSION

A fairly clear overall picture of Tabernas emerges from a study of the above material and a visit to the site. It seems to have been an easily defensible hilltop village probably occupied over a long period (judging by the still abundant surface sherds and the amount of finds recovered during excavations). That the inhabitants practised agriculture is attested by the wheat grains and the quern rubbers; whether they were pastoralists also is uncertain, despite the animal bones, since the writers are unable to ascertain whether these remains belong to wild or domesticated beasts. But the spindle-whorls imply spinning and therefore weaving (possibly of wool) and the strainers indicate dairy produce; both these activities presuppose the domestication of sheep or goats and the numerous animal-bone points strengthen the supposition. That these people were also hunters is attested by the deer horns and boar tusks. The seashells imply contact with the coast and the numerous implements of igneous rock might well also come from that direction since the Sierra de Gata is largely composed of such rocks. The mining of local copper ores and their smelting is proved by the crucible and the slag and the stone hammers might have served to crush the ores. The many stone axes and adzes certainly imply a forest environment and the wood fragments and the spokeshave confirm this deduction. The present arid desert of Almería was then well wooded and the deer horns and boar tusks support the assumption of a mixed forest setting.

It is far harder to trace the origins of the ideology of these people than to reconstruct their ecological environment. The schematized and phalange idols, for instance, hint at an Anatolian inspiration whereas the figurines suggest a Danubian ancestry. The phalli are equally at home in Anatolian and Balkan contexts but are also just as likely to represent the survival of older indigenous fertility practices. The linear decoration of the clay plaque might also plausibly be ascribed to an autochthonous mesolithic tradition. As things stand it might be suggested that Tabernas was founded by native Iberians who had already acquired a farming economy, either directly from the east Mediterranean or by a slower westerly Danubian expansion. Both these suggestions are consistent with the material described above and the real answer may well prove to be a combination of both, possibly at different periods.

A SURVEY OF THE TABERNAS MATERIAL

Whether these farmers were also metallurgists or whether this art was acquired at a later stage is open to question and can only be settled by future excavation. The present hazy picture of the site debars certain comparison with others of similar aspect (such as Vila Nova de San Pedro, where careful excavation has established the existence of two pre-Beaker settlements with certain evidence of metallurgy in the second of these).¹⁰ The only sure conclusion is that pedestalled bowls, ladles, painted pottery and twin-vases (*inter alia*) are common to both African/Aegean and Balkan/Danubian contexts and that both sources of inspiration must be considered as possible for the numerous similar Iberian types.

At this stage it is impossible to do more than guess at the chronological position of Tabernas. Its size and the amount of material imply a long duration and its roots most likely stretch well back into the Neolithic (as in nearby sites and as at Vila Nova). Assuming that the Beaker sherds represent its final stage we might deduce a mingling of Iberians of Mesolithic stock with farmers emigrating westward (either along the southern or northern coast of the Mediterranean). The site then became a chalcolithic community by the arrival of metallurgists (again of vague and possibly multiple origins) and was finally occupied by the Beaker folk. Favouring a short chronology the Chalcolithic period of Tabernas might reasonably be placed somewhere towards the end of the 3rd millennium, in Childe's Danubian II period, a conclusion not inconsistent with the above-discussed material.

ACKNOWLEDGEMENTS

The writers wish to thank the following to whom they are greatly indebted: Dr. I. W. Cornwall of the Institute of Archaeology of London University for analysing the crucible and slag and for identifying the deer horns and various other objects; Miss I. Gedye of the same Institute for cleaning the metal axe and awls; Dr. W. Campbell-Smith of the Natural History Section of the British Museum for petrological identification of some of the stone implements; Miss M. Scannell of the National Museum of Dublin for determining the nature of the cereal grains and the wood and Professor J. D. Evans of the Institute of Archaeology of London University for helpful general discussion and encouragement.

¹⁰ This then unpublished material was observed by one of the writers during the excavations of 1957 directed by Lt.-Colonel Afonso do Paço.

BOOK REVIEWS

COON, Carleton S. *The Origin of Races*. London, Jonathan Cape. 1963. xli, 724, xxipp. 32 Pls. 84 Figs. 13 maps. 63s.

Writing this note with *Homo habilis* still making his initial bow on the evolutionary stage, it is rather disconcerting to fit him into Coon's framework which rests on a thesis laid out with brief clarity towards the end of his book, '... at the beginning of our record, over half a million years ago, man was a single species, *Homo erectus*, perhaps already divided into five geographic races or subspecies. *Homo erectus* then evolved into *Homo sapiens* not once but five times, as each subspecies, living in its own territory, passed a critical threshold from a more brutal to a more sapient state.' (p. 657).

Not surprisingly such a view is controversial. A review note such as this is not the place to enter into such controversy, but it is valid to draw attention to the opinions expressed by others on both sides of the resulting argument. *The Mankind Quarterly* (Vol. III No. 3, 1963), reviews produced the following: 'In spite of the fact that each group dislikes the perspiration odor of the others, all will interbreed' (D. C. Rife, p. 192). 'The Negro has shown a high degree of evolutionary adaptation to manual work in the Tropics, but in all articulated societies, he sinks to the bottom of the social pyramid' (N. Weyl, p. 194). The comments and counter-comments in *Current Anthropology* (Vol. 4, No. 4, 1963) were marred by some peevisly irate replies by Coon. One point well made by T. Dobzhansky, (p. 366), is, 'If it were true that the Caucasoids 200,000 years ago attained the state that the Congoids achieved only 40,000 years ago, would it not follow that the rate of the evolutionary development of the Congoids was since then about five times faster than that of the Caucasoids?' A. Montagu (p. 362) asks, 'does it have to be re-proven every year that brain size within the normal range of variation characteristic of every human population has nothing whatever to do with intelligence?' Thereby bringing the attention back to the fact that the weight of books written about the human fossils probably far exceeds that of the bones themselves.

This last point brings one to the valuable core of the book and the one with the greatest archaeological interest, Chapters 7 to 12, where with a light, sure touch enlivened with humour, each and every valid find of hominid skeletal material is described, often redrawn to a consistent scheme, or illustrated by clear photographs. There are useful maps giving the position of each site, each of which is fully documented. In short we have a catalogue of the material collecting in one book the contents of scores of books and papers in inaccessible journals. We can gratefully accept this central pearl of fact, it would be best to keep an open mind concerning the irritating grains of controversy and opinion which give rise to it.

J. H. CHAPLIN

LAJOUX, J.D. *The Rock Paintings of Tassili*. London, Thames and Hudson. 1963. 202 pp. 164 Pls, 23 in colour. Maps. £3 15s.

WILLCOX, A. R. *The Rock Art of South Africa*. London, Nelson. 1963. 144 pp. 32 Pls, 20 in colour. £4 10s.

'Scientists do not like imponderables, artists do not like to limit themselves to the verbally definable; the result has been an unhappy mixture of objective scientific and subjective art jargon.' So writes the second author and he might well be shouting his dictum across the intervening equatorial forests to his opposite number, as the latter phrases are singularly appropriate to the text of the Tassili volume. The value of Lajoux's book is in the illustrations, magnificently well printed in Italy, and bringing us the details of the paintings, concerning which Lhote had earlier

BOOK REVIEWS

whetted our appetites. The word 'masterpiece' is in danger of being overworked but at its best the Saharan rock-art reaches this level. We have but to look at the silhouettes of Sefar and the vivid dancing figure of Tadjéamine, while some of the domestic scenes—the woman dragging the reluctant child at Ozanearé—have all the acute observation of skilled cartoonists of the rank of Giles, Pont or Vicky. Yet once one has commended the illustrations and the excellent maps one is left with several complaints; there is an almost entire absence of scale, a vital criterion in comparing the art of different cultures. The pictures are an end in themselves, a worthy end no doubt, but how much better if the text had compared in excellence with them. Perhaps the author would have been wiser to collaborate and given us a far more scientific appraisal of the position of the art in archaeological contexts; as it is the reader must do this for himself.

Travelling south we cross the Limpopo River and Willcox takes us step by step through the Phoenician miasma and brings us face to face with the Bushman artist, his Wilton/Smithfield C artefacts around him, his painting gear close at hand, the high-veld and the mountains where he can wander freely until the cattlemen drive him back to the inhospitable Kalahari, where he lingers to taunt us with his freedom and vex us with might-have-beens, as his retreat came just at the peak of his painting craft, an art matured over the few millenia of his occupancy.

While the author is strictly factual in his accounts this does not prevent humour from breaking in and the book is a pleasure to read. The coloured illustrations are not of the same standard as the Saharan book, but the intention of the author is different. Willcox uses each of his plates to illustrate his text and is more concerned with conveying information than titillating his readers' eye. For each painting the size is given, and the maps are models of their kind, large enough for easy reference and uncluttered. The drawings of petroglyphs by A. A. Telford deserve particular mention as models of clarity.

The separation of the art into four regions, one of which is devoted exclusively to petroglyphs, and the movements of the Bushmen who were the main artists, are both convincingly demonstrated. Although the author sets his face resolutely against the Greeks, Egyptians and other foreigners, and insists that painters and painted are strictly African, he does allow the possibility of a later non-Bush, or Bush-hybrid group entering south west Africa, which is in any case peripheral to his main area of consideration. Specific sites cannot be dealt with here, but one cannot emphasize often enough that the White Lady of the Brandberg is certainly no Lady but a youth and probably any whiteness was temporarily added for decoration. My favourite picture is a masterly use of some six clear feet of rock-face near Clanwilliam, with three small figures, the largest only 5 inches long, of a man chasing an antelope calf separated from its mother.

This is a book that will form a firm foundation for all future work on the rock art of Southern Africa, which, to quote the author, was 'executed for the pleasure of the artist in the work and the reciprocal pleasure of the beholder.'

J. H. CHAPLIN

FREE, Joseph P. *Archaeology and Bible History*. Seventh ed., revised. Wheaton, Illinois, 1963. 398 pp. 19 Pls. maps. \$5.

One of the most difficult questions usually confronting the historian of ancient Palestine is that of the value to be placed on the Bible as a historical source. The author of this book is fortunate in not having to face this problem. Approaching the subject from the entrenched position of the 'Bible believer', or fundamentalist, he holds that the Bible is the 'record of God's revelation . . . accurate in all respects' (p. 3)—even down to the details of the six-day Creation (p. 21)—and so, for him, Biblical archaeology merely confirms and illuminates a written record which is already in itself consistent and authoritative. Much could be written on this approach to the Scriptures, but this is obviously not the place. It is important to note, however, that it is, by definition, an uncritical approach, and this may explain why Dr. Free's handling of the archaeological material is equally uncritical. Just as it never occurs to him to doubt the validity of what he reads in the Bible, so, it would seem, it has never occurred to him to question the opinions of any previous scholar, provided that those opinions happen to coincide with his own. He quotes with approval

BOOK REVIEWS

Garstang's views on the date and nature of the fall of Jericho at the time of the Exodus, and relegates to an entirely inadequate and misleading 'Supplement' of twelve lines an account of the important evidence on this problem revealed by the Kenyon excavations (p. 137). It is almost beyond belief that, in a book supposedly revised and re-issued in 1962, photographs purporting to show 'Joshua's walls' and the ash layer marking the destruction of the Late Bronze Age town can still be reproduced (Figs. 8 and 9). Examples of such partiality could be multiplied; but they are, perhaps, not so damning as the positive pervasiveness that Dr. Free exhibits on occasion, for example in connection with the Philistine question. This particular problem revolves round the fact that, according to *Genesis* XXI 32-34, there were Philistines living in southern Palestine at the time of Abraham (c. 2000 B.C.), whereas archaeological and epigraphic evidence indicates that these people first settled in the country some eight hundred years later. Unlike critical scholars, Dr. Free is not perplexed by this. 'Actually,' he says, 'there is no contradiction. The whole liberal [i.e. critical] argument is based on silence. As yet no conclusive archaeological evidence has been unearthed showing that there were Philistines in Palestine in 2000 B.C. It is entirely possible, however, that they were in Palestine at this early date, and that their numbers were increased by other Philistines from the Aegaeon area about 1200 B.C. This last influx is demonstrated by the archaeological discoveries. It is entirely possible that we shall find conclusive archaeological evidence of earlier Philistines in Canaan' (pp. 65-6).

No more need be said to indicate that this book is of little use to the serious student of Palestinian archaeology, and that it can claim a place on our shelves only by reason of its curiosity value.

PETER J. PARR

POTRATZ, Johannes A. H. *Die Skythen in Südrussland. Ein untergegangenes Volk in Südosteuropa*. Basel, Roggi Verlag. 1963. 198 pp. 94 Pls. 105 Figs.

The title of this book is misleading; and so also is the head-piece of the paper-cover which shows one of the 'animal brooches' of the famous gold hoard from Michalków in West Podolia, one of the most important finds of the 'Thraco-Cimmerian' (pre-Scythian) group of remains in Central Europe.

There is no reference in the book to the history of the Scythians in South Russia; nor is there any description of their customs, burial rites, etc. Their division into tribes, distinguished by Herodotus and well reflected in the archaeological material from the Ukraine, has not been even mentioned. Nearly one third of the book is devoted to Scythian art; its 'West-Iranian' background has been emphasized, in which the author follows several scholars who have previously published their views on this subject. Two chapters are devoted respectively to the 'Thraco-Cimmerian' and Scythian remains in Central Europe, but the relevant literature quoted by the author does not go much beyond 1939. He does not refer to the finds of the 'Thraco-Cimmerian' type found in the Ukraine and published in the Soviet archaeological literature. Neither apparently has he heard of the cemetery of Szentes-Vekerzug, nor about other 'Thraco-Cimmerian' and Scythian remains found or excavated since the last war within the territory enclosed by the Carpathians, the Alps and the Danube.

The only useful part of the book (approximately half of its content) is devoted to a detailed description of horse cheek-pieces (200 specimens) which have been divided into 66 types and sub-groups. Scythian and Siberian (Sarmatian), but also 'Thraco-Cimmerian' specimens from South Russia and Hungary have been listed and the relative literature quoted.

This is definitely not a book for the general reader, and still less for the specialist. Surely, an article in one of the many archaeological periodicals would have been a much more appropriate place for the study of the cheek-pieces.

T. SULIMIRSKI

GHIRSHMAN, Roman. *Persia. From the Origins to Alexander the Great*. Trans. by Stuart Gilbert and James Emmons. London, Thames and Hudson, 1964. 440 pp. 589 illustrations, 80 in colour. (Arts of Mankind 5). £7 10s.

With this sequel to his *Parthians and Sassanians*, M. Ghirshman has carried Iranian history back a further thousand years. He has chosen here to concentrate on the first millennium B.C., although his title leads one to expect a greater span. The first 500 years of this period are complex and the dating of sites and objects is controversial. Occasional glimpses of the contenders for power on the plateau are given by Assyrian and Urartian scribes; but there is no contemporary written evidence from within Iran itself. While chance finds by peasants have filled museums and private collections with a wide range of objects of this date, archaeology provides only a bare chronological framework into which they should be fitted. M. Ghirshman has had access to many private collections in America, Europe and Iran itself—and the publication of some of this little-known material is of value.

The author has attempted to bring order into an incoherent mass of varied material and to place it in an historical perspective. He is preoccupied with the role played by the Scythians and Cimmerians and postulates a 'basic homogeneity of the Medo-Scythian-Cimmerian civilisations', but unfortunately neither history nor archaeology has yet provided sufficient evidence for a precise definition of any one of these three components.

From the scattered collection of objects found by illicit diggers at Ziwiye, M. Ghirshman imaginatively reconstructs the burial of a Royal Scythian, as described by Herodotus (IV, 71, 72) and dates it c. 600 B.C.—a proposition which can hardly be accepted. While some claim that surface sherds from Ziwiye are of this date, most authorities believe that the treasure is considerably older.

One of the many interesting and unusual facts which the author has pointed out is that the pleated Persian robe, commonly known as the *candys*, and the fluted hat or *tiara* were first represented on Luristan bronzes, two centuries before being depicted at Persepolis.

This volume presents the general reader with a vivid pictorial and textual account of life on the plateau. It shows the interplay of ideas and motifs stretching from China to Greece and Italy and stresses the artistic debt which all great civilisations owe to their predecessors. Many readers may be stimulated, but few will readily agree with all the fanciful theories that have been propounded here. M. Ghirshman's book will long remain a useful pictorial compendium of first millennium art.

GEORGINA THOMPSON

GARDIN, Jean-Claude. *Lashkari Bazar. Vol. II. Les trouvailles: céramiques et monnaies de Lashkari Bazar et de Bust*. Paris, Klincksiek. 1963. X, 198 pp. 30 Pls. (Mémoires de la Délégation Archéologique Française en Afghanistan XVIII).

This publication forms the second volume (*Vol. I. Les édifices*, is announced for later in 1964) of the final report on excavations by the D.A.F.A. near Bust, the great fortress of S. Afghanistan at the junction of the rivers Helmand and Arghandab. To judge by Pliny, NH VI, 92, the main citadel could date back to Parthian times. Its later vicissitudes were famous as an eastern outpost during the expansion of Islam. The excavations now recorded were carried out mainly at Lashkari Bazar, the Ghaznavid palace-complex 7 km north of the citadel, which was founded c. A.D. 1000, re-utilized by the Ghorids during the 12th century, and finally destroyed by the Mongols c. A.D. 1220. Three trial excavations were also carried out at Bust itself. Of these the most instructive revealed in its lower strata two classes of pottery pre-dating the Ghaznavid period, whilst material from the upper layers corresponded with that at Lashkari Bazar. These earlier wares were, below, a 'céramique grossière à engobe gris noir', above which came a 'céramique rouge-orange, souvent lissée', considered by the author to have persisted from the Kushan period (2nd-3rd century A.D.) until the 9th century. Though the area explored here was limited, the results help to illustrate the interest of the site for the pre-Muslim period.

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None-the-less, it is the decorated ceramics from Lashkari Bazar which form the main subject of the report. They receive perhaps the most systematic presentation yet achieved of pottery from an Islamic site. These wares appear c. A.D. 1000, and consist of unglazed, and of glazed pottery in equal proportions. The most important of the unglazed is that with moulded decoration, here arranged typologically. Numerous analogies of interest are cited for the decoration, and these extend to the metalwork of the migration period in Europe and Central Asia. In contrast the glazed pottery evolved more rapidly, permitting a closer chronology. From the occurrence of different varieties in one, or both, of two areas (the bazaar and the 'Great Castle') where occupation is closely dated by coins, the following arrangement results:

c. A.D. 1000–1075 Polychrome painting on slip (so-called 'Samanid' ware).

c. A.D. 1075–1175 Green and brown painting on slip, with incised decoration.

c. A.D. 1125–1220 Green painting on slip, with incised decoration. Also painting without slip.

The inventory of coins includes only 41 specimens, but these are valuable not only for their exact dates, but also because the little-known copper issues throw light on local history. A remarkable *fals* of Bust dated 359/969 confirms the name of a Turkish adventurer Baituz, noticed by several historians. This study makes a notable contribution to the chronology of pre-Mongol ceramics in Khurasan, and will be a standard reference for future excavators.

A. D. H. BIVAR

WATERFIELD, Gordon. *Layard of Nineveh*. London, John Murray, 1963. 535 pp. Illus. 35s.

The actual lifetime of Austen Henry Layard corresponded as closely as need matter to the reign of Queen Victoria. Yet in comparison with others who now rank as great Victorians, his life-story appears strangely non-conformist. His earliest initiative was, as we know, in a field of discovery not previously conceived to be possible. Its phenomenal success amazed and delighted the Victorian world and by the age of thirty-five raised him to a pinnacle of notoriety which his writing converted into lasting fame. But this was only the beginning of the story. Layard had discovered Nineveh and now also it became abundantly clear that, in the words of Emily Eden, Nineveh had discovered Layard.

Early in the eighteen fifties he lost interest in archaeology and entered on a distinguished political career which in itself would have sufficed to assure him an impressive entry in the Dictionary of National Biography. Member of Parliament, Under-Secretary for Foreign Affairs, Ambassador in Constantinople, Minister in Madrid and finally benefactor of the National Gallery; in all these capacities his strength of purpose as an intuitive radical became manifest, combined, where his adversaries were concerned, with something which today one would describe as a substantial nuisance value. The story of Layard's Mesopotamian discoveries had an epic quality which ensured its survival within the memory of a later generation. His impact on the Victorian political scene has been largely forgotten.

For this reason one welcomes Gordon Waterfield's excellent biography, which covers both phases of Layard's life. Layard lived long and was a prolific writer, especially for the purpose of self-justification. Mr. Waterfield, therefore, had a huge volume of material to draw upon, including the 340 volumes of Layard Papers in the British Museum, and an unpublished memoir of almost a million words. Lady Layard (as one would expect from the photograph on p. 423) also kept a diary. The story of her husband's adventures as an oriental traveller and archaeologist is best told in his own three famous books. Of their political life together Mr. Waterfield has made a narrative of almost comparable interest, faithfully recreating the political climate of an imperial age and the stature of a generation which sustained it. If he had not occasionally failed to conceal his own irritation at the snap-judgments upon which Layard's mountainous prejudices tended to be based, the sincerity of his own admiration would perhaps have been suspect.

SETON LLOYD

BOOK REVIEWS

ROUX, Georges. *Ancient Iraq*. London, Allen & Unwin, 1964. 431 pp. 33 pls. 5 maps. 50s.

This is an admirable short work by a newcomer to the field of semi-popular writers on Near Eastern history and archaeology. Dr. Roux was already known to a limited circle of readers for his articles on ancient Iraq in the journal of an oil company during the late nineteen-fifties. He is here described as a 'French physician living and working in London', which may or may not account for the attractively lucid style of his English: it certainly leaves unexplained the authority and erudition with which he brings our knowledge of Mesopotamian antiquity into line, even with the most recent journal articles.

Dr. Roux's present book is one which, quite apart from its readability, will help to satisfy an important requirement in archaeological education. It treats with the authority of much reading and consideration, a subject on which the few existing handbooks are for the most part considerably out of date. (The exception is perhaps Dr. Saggs' *Greatness that was Babylon*, which *Ancient Iraq* seems to supplement with a great deal of on-the-spot observation). In fact, it shows throughout evidence of real and long-standing familiarity with the eccentricities of the geographical and anthropological background against which Mesopotamian history was created.

Judging from a recent article of his own, on the archaeology of the great Hammar Lake in south Iraq, Dr. Roux's travels must have been extensive and his association with professional workers profitable. Many long-standing fallacies regarding the beginnings of civilization in Iraq are now decorously corrected. Theories about the stability or otherwise of the southern coastline in early times are changing: characters like Gilgamesh, hitherto regarded as legendary, are acquiring historical solidarity: salinisation of the soil has appeared as a contributory factor to the northward shift of Sumerian agriculture: Assyria has developed a prosperous early history under our new friend Shamsi-Adad I. All these developments Dr. Roux notes. But also, as one suspects with less justification, he dismisses Woolley's deposit of 'water borne clay' at Ur as evidence for a major flood on Biblical lines.

The book has usefully up-to-date maps and is well illustrated, except for certain architectural reconstructions which are unskillfully redrawn. Hill's now famous perspective of the Ischali temple is travestied in Fig. 17 at an uncomfortably dizzy angle.

SETON LLOYD

GREEN, Charles. *Sutton Hoo, the excavation of a royal ship burial*. London, Merlin Press. 1963. 168 pp. 25 Pls. 32 Figs. 35s.

The audience of this book, says Mr. Green, is the 'enlightened layman'. The author has produced a well-written book which will appeal to such an audience. The final report on the Sutton Hoo ship-burial has not yet appeared—although it is in active preparation—and a preliminary report is obviously necessary. Preliminary reports have, however, been written—both for the specialist, in a large number of papers in learned journals, and for the layman, in the excellent British Museum *Guide* (which sells at seven shillings)—and it is difficult to see why a lavish and expensive book of this sort is needed at the moment. The British Museum *Guide* and Mr. Bruce-Mitford's articles, particularly that published as an appendix to the latest edition of Hodgkin's *A History of the Anglo-Saxons*, provide all that the most ardent layman could require in the way of up-to-date information about the Sutton Hoo ship-burial.

Most of the book is a re-hash of the existing publications and, apart from some maps (which are largely re-drawn from secondary sources), there are, speaking charitably, six line illustrations and one third of a plate in this book which have not been published before (the object illustrated in this third of a plate—the Loveden Hill whetstone—has been previously mentioned in relation to Sutton Hoo, but (as the excavations are still in progress) the object has not been published).

The new material—figures and text—relates mainly to the smaller ship-burial found at Sutton Hoo in 1938, to boats and voyages, and to the settlement of East Anglia. The 1938 material is important and Mr. Green must be congratulated for his full description and discussion of it. The chapters on boats and voyages are not very exciting and rather speculative, while there is little that is new in the other general chapters.

DAVID M. WILSON

BOOK REVIEWS

PAINTER, K. S. *The Severn Basin*. London, Cory, Adams & Mackay, 1964. 72 pp. 43 figs. (Regional Archaeologies). 15s.

This is the first of a series of Regional Archaeologies to be produced by Cory, Adams and Mackay, designed 'to provide an authoritative introduction to local archaeology for schools and school libraries, students, adult education groups and amateur field workers.' There is certainly a lack, in many districts, of a straightforward and concise account of the local archaeological development, a summary of the main excavations and finds in the area.

But I am not sure that Mr. Painter has completely successfully filled this need for the Severn Basin. It is difficult to decide how much general archaeological explanation to include, but in writing what is primarily a regional archaeological survey surely it is best to concentrate on the local finds and to provide background information only where absolutely necessary. This book does not need to explain the origins of the farming economy in the Near East nor the Palaeolithic sequence of Acheulian, Clactonian and Levalloisian (which refers to a method of preparing flint flakes rather than to a distinct human industry as do the other two terms). There is so little reliable material of the Palaeolithic and Mesolithic periods in the area that it seems a pity to spend three chapters having to use examples from other areas in the British Isles and the continent in order to give an account of the normal development. Also as there is a reference to 'Roman Britain' by Professor Richmond it seems unnecessary to include so much detail of the history of Roman Britain. This is especially so as in such a short book much interesting local information that is directly relevant to the later prehistoric periods in particular has had to be omitted.

However there is a great deal of useful material in this book and the author has presented a balanced and interesting picture of the gradual economic changes that took place in the Severn Basin from the Palaeolithic occupants to the withdrawal of the Roman legions.

The list of sites, with brief details about each, is very valuable in encouraging readers to visit, at least, the better known monuments in the area. It is a pity that the plates are so badly reproduced but certainly this is a commendable introduction to a series that is, on the whole, well-produced for the price, and will serve to stimulate interest in local archaeology, to provide a firm basis of knowledge for those already interested and will encourage them to consult more detailed archaeological works.

MARY JANE MOUNTAIN

The following books have been received. The fact that they are listed here does not preclude their review in a later issue:—

BIEK, L., *Archaeology and the Microscope*. London, Lutterworth Press, 1963. 45s.

BOARDMAN, J. *Greek Art*. London, Thames & Hudson, 1964. 35s.

BROTHWELL, D. & HIGGS, E. S. *Science in Archaeology*. London, Thames and Hudson, 1963. 90s.

COLE, SONIA. *The Prehistory of East Africa*. London, Weidenfeld & Nicholson, 1964. 55s.

DANIEL, G. & FOSTER, I. H. (edd.). *Prehistoric and Early Wales*. London, Routledge, 1965. 60s.

DOCKSTADER, F. J. *Indian Art of Central America*. London, Cory Adams and Mackay 1964, 7 gns.

GREEN, D. *Understanding Pottery Glazes*. London, Faber, 1963.

HANFEMANN, G. M. *Roman Art*. London, Cory Adams & Mackay. 1964. 5 gns.

MILLER, R. L. & KAHN, J. S. *Statistical Analysis in the Geological Sciences*. New York, Wiley, 1962.

PARSONS, C. S. M. & CURL, FREDERIC. *China Mending and Restoration*. London, Faber, 1963. 5 gns.

PYDDOKE, E. *The Scientist and Archaeology*. London, Phoenix, 1963.

TROEBST, G. C. *Conquest of the Sea*. Trans. by Brian C. Price and Elsbeth Price. London, Hodder & Stoughton, 1963. 30s.

THE VIATOIRES. *Roman Roads in the South-East Midlands*. London, Gollancz, 1964. 70s.

TAYLOUR, LORD W. *The Mycenaeans*. Thames & Hudson (Ancient Peoples & Places series). 1964. 35s.

O'RIORDAIN, S. P. & DANIEL, G. *New Grange*. Thames & Hudson (Ancient Peoples & Places series). 1964. 35s.

FOX, A. *South-West England*. 1964. Thames & Hudson (Ancient Peoples and Places series). 35s.

UNIVERSITY OF LONDON

INSTITUTE OF ARCHAEOLOGY

Twentieth
ANNUAL REPORT

1 August 1962 – 31 July 1963

INSTITUTE OF ARCHAEOLOGY

COMMITTEE OF MANAGEMENT

- THE VICE-CHANCELLOR (Dr. P. S. Noble)
THE CHAIRMAN OF CONVOCATION (Dr. C. F. Harris)
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The Director of the Institute (Professor W. F. Grimes)
The Director of the Courtauld Institute of Art (or other representative) (Dr. G. Zarnecki)
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The President of the Council for British Archaeology (or other representative) (Dr. D. B. Harden)
The President of the Prehistoric Society (or other representative) (Dr. J. D. Cowen)
The President of the Society of Antiquaries of London (or other representative) (Sir Mortimer Wheeler)

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Professor K. de B. Codrington	Sir John Lockwood
Professor P. E. Corbett	Professor F. Norman
Professor W. B. Emery	Professor A. H. Smith
Professor C. Daryll Forde	Professor S. W. Wooldridge

Two members of the Academic Staff nominated by the Academic Board:—

Professor J. D. Evans	Professor S. S. Frere
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Five other persons:—

Mr. R. L. S. Bruce-Mitford	Dr. E. G. M. Fletcher
Professor J. G. D. Clark	Professor D. McKie
One vacancy	

PROFESSOR S. W. WOOLDRIDGE

The Institute suffered a serious loss in the death of Professor Wooldridge in April. Professor Wooldridge had been a member of the Committee since 1950 and had acted as Chairman from December of that year until the time of his death.

REPORT OF THE DIRECTOR FOR THE SESSION 1962/63

ADMINISTRATION

Director: Professor W. F. Grimes, C.B.E., D.Litt., F.S.A., F.M.A. (A.T.)*

Secretary and Registrar: E. Pyddoke, F.S.A.

Director's Secretary: Mrs. M. Hunt

Chief Clerk: Miss M. F. Varese

Senior Clerk: Miss H. I. Fuller

Clerks: Mrs. J. A. Karayiannis

Miss M. Exton

Staff matters

The Director continued to serve as Chairman of the Council for British Archaeology Committees on Ancient Fields and on Industrial Archaeology, the London Topographical Society and the Management Committee of the Field Studies Council and as Vice-President of the Council for British Archaeology and of the Society for Medieval Archaeology. He was appointed Chairman of the Faculty of Archaeology, History and Letters of the British School at Rome and President of the Cambrian Archaeological Association.

He was appointed to represent the University on the Roman and Mediaeval London Excavation Council.

Professor Zeuner represented the University at the Pan African Congress on Prehistory held in the Canary Islands in September, 1963. Dr. Cornwall continued as a member of the Research Committee on Archaeological Field Experiments of the British Association for the Advancement of Science. Dr. Waechter was granted leave of absence for two years to study sites and Palaeolithic material in Nubia.

Professor Seton Lloyd succeeded Professor Mallowan in the Chair of Western Asiatic Archaeology in October.

The title of Professor of the Archaeology of the Roman Provinces was conferred on Mr. Frere in January.

Dr. Hodson attended the Ogham Conference at Roanne, at which he read a paper.

Miss Gedye and Mr. Hodges lectured in the course for overseas conservators on the Conservation of Antiquities which was sponsored by the British Council in June-July. Miss Gedye was re-appointed Secretary of the United Kingdom Group of the International Institute for Conservation and Mr. Hodges was appointed Treasurer. Mr. Hodges continued as Secretary of Section H of the British Association.

*A.T. Appointed Teacher, R.T. Recognised Teacher of the University of London, throughout.

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Mr. Cookson attended the Photokina Exhibition in Cologne. He also visited German University and other Museums to study their dark-room and laboratory installations.

Mr. Pyddoke was appointed to represent the University on the Council for British Archaeology. He was also appointed Treasurer of the British Association Research Committee on Archaeological Field Experiments.

Visiting Scholars

Professor W. A. Ashburn (Baldwin-Wallace College, Ohio), Mrs. R. Bryan (U.S.A. National Science Foundation Fellow), and Dr. S. P. Gupta (National Museum, New Delhi) worked in the Institute for varying periods during the session.

Public Lectures and Exhibitions

A total of 15 public lectures was given during the session, two of which were held jointly with the Institute of Classical Studies.

Professor Helmuth Schlunk delivered three Special University Lectures on 'The Early Christian Mausoleum of Centcelles near Tarragona' and 'Classical and Oriental traditions in the art of the Iberian Peninsula during the Early Christian and Visigothic periods I and II' during the spring term. Attendances averaged 54.

Other public lectures covered a wide variety of archaeological subjects and audiences averaged 102. The lecturers included Mr. G. Bass (Pennsylvania Museum), Dr. S. P. Gupta (National Museum, New Delhi), Dr. B. S. J. Isserlin (University of Leeds), Mr. James Mellaart (University of Istanbul), Professor T. Özguç (University of Ankara), Miss Squarciapino (University of Rome), Lord William Taylour and Mr. Rex Wailes (Ministry of Works Consultant on Industrial Archaeology).

In October 1962 an exhibition was staged in the entrance hall by the Egypt Exploration Society of the finds from recent excavations at Qasr Ibrim. An exhibition of photographs of archaeological material from Rumania, supplied by the Rumanian National Committee of UNESCO was on show during February and March, 1963; and in connection with the Prehistoric Society's Easter Conference, an exhibition was organised to illustrate Late Bronze Age metal working in the British Isles and N.W. Europe.

The Institute continued to co-operate with the Extra-Mural Department in teaching for the University Extension Diploma in Archaeology. Several of the courses were again held in the building and were given by, among others, three members of the staff, Miss J. M. Sheldon, Mr. J. Williams and Dr. A. Rosenfeld, and by past and present students, Dr. Seton Williams, Miss E. Horrocks and Mr. Robertson Mackay. The Director again acted as External Examiner.

REPORT OF THE DIRECTOR FOR THE SESSION 1962/63

Students

The total number of students registered at the Institute during the session was 115: besides these 69 Intercollegiate students attended courses. Of those at the Institute 27 were registered for Diplomas, 40 for Higher Degrees (30 full-time and 10 part-time), 6 for special research under Statute 21 (iii) (3 full-time and 3 part-time), 15 as full-time Technical students and 9 for the Course on the Conservation of Historical Monuments. Sixteen Occasional students attended lectures and used the facilities of the Institute and 2 students attended courses as full-time Occasional students.

Six students were awarded the Diploma in European Archaeology (Section A: Prehistoric Europe), one the Diploma in European Archaeology (Section B1: Iron Age and Roman Provinces), one the Diploma in Prehistoric Archaeology and one the Diploma in Western Asiatic Archaeology, the last with Distinction.

Of the 40 Higher Degree students 14 were registered for the Ph.D. full-time (3 in the Faculty of Science) and 5 part-time. Fourteen were registered for the M.A. full-time and 5 part-time. Two were registered for the M.Sc., one of them part-time. Three Ph.D. degrees were awarded, to Mr. P. J. Ucko (Prehistoric European Department) and Mrs. H. Crawford (née Browne) (Western Asiatic Department) in December, and to Mrs. Frances James (Western Asiatic Department) in June.

Five students qualified for the Institute's internal Certificate in Conservation and Technology and two for the internal Certificate in the Conservation of Historical Monuments.

The following overseas countries were represented among students registered at the Institute: Australia, 4; Belgium, 1; Ceylon, 2; Denmark, 1; Germany, 1; Greece, 1; India, 6; Iran, 1; Iraq, 3; Israel, 1; Jordan, 2; Libya, 1; Malta, 1; Rhodesia, 1; Spain, 1; U.S.A., 10; Yugoslavia, 1.

Gifts

Miss M. Cockle, who studied for the Extra-Mural Diploma in Archaeology, made a gift of £25 to the Institute Library.

Gordon Childe Prize and Bequest Fund

The Gordon Childe Prizes for 1962/63 were awarded to Mrs. Cressida Ridley and Miss Georgina Thompson who were both successful in the June examinations for the Academic Postgraduate Diploma in Archaeology, the former in Prehistoric European Archaeology and the latter in Western Asiatic Archaeology, in which she obtained a Distinction.

Grants from the Bequest Fund were made to Dr. Sulimirski in connection with his studies in the Neolithic and Bronze Ages of Eastern Europe; to Professor Frere to

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assist him in his excavation of Samian pottery kilns at Lezoux in Central France; and to Mr. James Mellaart towards the cost of his excavation at Çatal Hüyük.

Margary Fund

This year for the first time the Institute was able to take advantage of Mr. Margary's recent generous gift and grants were awarded to twelve students from the Fund which bears his name. Six of these grants were awarded to assist with travel expenses to France to participate in excavations there, one for travelling expenses to Italy to take part in an excavation, two for travelling to Denmark to study collections and sites, one towards the cost of going to Anatolia to study pottery techniques and two towards expenses when visiting collections in British museums.

TEACHING AND RESEARCH

Institute Field Course

The Field Course was again held at the end of the summer term at Druids Lodge, Wiltshire, with Stockton Earthworks as the chief centre of operations. On this occasion no excavation was attempted and the period of the course was reduced from three weeks to a fortnight; but the reduction in the time combined with bad weather to reduce the amount of work done and the experiment was not a success. Dr. Aitken of Oxford and Mr. Anthony Clark collaborated on the scientific side as in 1962. The Director was assisted by Dr. Hodson, who was in charge of the prospecting and by Dr. Cornwall on the environmental side, with Mr. Stewart and Mr. Cookson dealing with surveying and photography as in the past. Professor Zeuner visited for one day and led a long-distance excursion to sites in Hampshire and Dorset. Mr. Pyddoke and Mr. Cookson were responsible for administration. The Institute's thanks are once again due to Messrs. Felix Fenston and E. R. Turpin for much kindness at Druid's Lodge and to Messrs. Yeatman-Biggs, M. Stratton and F. Sykes for the facilities so readily granted at Stockton.

Research Seminar in Archaeology and Related Subjects

During the past year the Seminar (of which Dr. P. J. Ucko continued to act as secretary) met three times. At two meetings burials and grave goods were discussed from two points of view: that of a culture in touch with the Classical world, and that of a modern non-literate society with complex and diverse mortuary customs. At the third meeting the relevance of modern physical anthropological techniques to pre-history was discussed, and particular examples from Polynesia, Africa and the Vikings were presented.

REPORT OF THE DIRECTOR FOR THE SESSION 1962/63

The policy of circulating papers before the meetings was continued, as was the practice of having chairmen from interested disciplines, rather than from that of the speaker. Thus medieval tombstones was chaired by a prehistorian; ethnographic mortuary customs by an ancient historian; and physical anthropology by an environmental archaeologist. As in previous meetings these practices were found to be highly successful.

Attendances at these meetings were very encouraging: on average about 40 people. Discussions continued well into the evening.

Motya

Participation with Leeds University in the expedition to Motya was continued. Miss Taylor led a party at Easter for three weeks to work on the material and Dr. Isserlin of Leeds University carried out a further season of excavation in July. Mr. Cookson was again responsible for the photography and Miss Alexandra Madeira, a Conservation student, also participated in the work.

THE DEPARTMENTS

The Director's general introductory course on archaeology was attended by 18 intercollegiate students. In December he brought to an end nearly fifteen years of continuous excavation in the bombed areas of the City of London, but he continued to act as consultant to the City of London and the Ministry of Public Building and Works in the treatment of features in London Wall which have been revealed by these excavations and which it is intended to preserve permanently to view. He gave a number of outside lectures.

Publications:

'The Stone Circles and Related Monuments of Wales' in *Culture and Environment*, London 1963, 93-152.

ENVIRONMENTAL ARCHAEOLOGY

Professor: F. E. Zeuner, Ph.D., D.Sc., F.S.A. (A.T.)

Lecturers: I. W. Cornwall, Ph.D. (R.T.)

J. d'A Waechter, Ph.D., F.S.A. (R.T.)

Assistant: Miss J. M. Sheldon

Honorary Assistant: Mrs. M. Barton

The number of students working in the Department during the year was 21, 5 being registered for the Ph.D., 4 for the M.A., 2 for the M.Sc., 2 for the Post-graduate

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Diploma in Prehistoric Archaeology, and 6 for research under Statute 21 (iii). Of the Higher Degree students, 5 were registered in the Faculty of Science and 6 in the Faculty of Arts. There were two Occasional students. The Higher Degree students worked on the following subjects during the session:

Ph.D.

- C. Banks, Mrs. (née Grigson) (Faculty of Science): Prehistoric cattle remains from Europe and India.
G. W. P. Jarvis (*part-time*) (Faculty of Arts): Sites in the Lea Valley.
G. Naylor (Faculty of Science): Palaeoclimatology.
A. C. Patel (Faculty of Science): Loess sites in Europe.
B. Rossello, Mrs. (Faculty of Arts): Geographical and chronological distribution of signs in Palaeolithic Art.

M.Sc.

- R. W. Andrews (*part-time*) (Faculty of Science): British varved clays.
S. Limbrey, Miss (Faculty of Science): Radioactivity Methods in archaeology.

M.A.

- A. Akeroyd, Miss (Faculty of Arts): Sea-levels in relation to archaeological sites.
M. A. B. Harlow (*part-time*) (Faculty of Arts): Environmental aspects of North African rock-drawings.
D. Mathewson (Faculty of Arts): Weathering processes on archaeological objects.
J. L. Williams (*part-time*) (Faculty of Arts): Technology of prehistoric pottery.

Statute 21 (iii)

- R. Bryan, Mrs. and A. Bryan, Dr.: Environmental Archaeology in the Southend region.
A. C. Western, Miss (*part-time*): Identification of wood from archaeological sites.
B. Westley, Mrs. (*part-time*): Faunas from archaeological sites.
S. P. Gupta: Soils of India.
T. Yisraeli, Miss (*part-time*): Comparative study of Neolithic Stone Industries in S. E. Mediterranean Area.

Mrs. L. B. G. Haglund-Calley was successful in the Post-graduate Diploma examination in June, 1963.

Professor Zeuner continued to work on material from the Canary Islands. In addition he visited the following countries to do field work: Greenland, Iceland, Russia, the Canary Islands and Morocco.

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Dr. Cornwall visited a number of excavations in this country at the request of the excavators in order to study soil problems. In addition, over 100 samples of soils and bones, including three complete skeletons, were dealt with during the year. The overseas sites included one at Ras Shamra, Syria (Bronze Age), a site in the Calima Valley, Colombia, South America (pre-Conquest), and Kalomo, Northern Rhodesia (c. 900–1400 A.D.). In this country, Bronze Age barrows at Overton Hill, Wilts. and the Lake Barrows, Wilts. provided osteological and pedological problems. Soils were also studied from West Ayton Neolithic long barrow, Yorks. and Robin Hood's Ball Neolithic camp, Wilts. Dr. Cornwall continued to participate in the work of the British Association Research Committee on Archaeological Field Experiments, which made its first examination of the experimental earthwork on Overton Down, Wilts. and erected a second earthwork on Wareham Heath, Dorset.

Publications:

By Professor Zeuner:

History of Domesticated Animals, 559 pp., Hutchinsons, 1963.

'Fossil Insects from the Lower Lias of Charmouth, Dorset', *Bull. Brit. Mus. (Nat. Hist.)*, Vol. 7, No. 5, 1962, 155–171.

'Fish on Ancient Coins', *Spink and Son's Numis. Circ.*, July–August, 1963, 2 pp.

'The origins of domesticated animals', *Span*, Vol. 6, No. 2, 1963, 5 pp.

'The History of the Domestication of Cattle', in *Man and Cattle*, Occasional Paper No. 18 of the Royal Anthropological Institute of Great Britain and Ireland (1963), 9–19.

'Environment of Early Man with Special Reference to the Tropical Regions', *Maharaja Sayajirao Mem. Lect.* 1960–61 (publ. 1963), 32 pp.

By Dr. Cornwall:

'Soil, Stratification and Environment', *Science in Archaeology*, 1963, Thames and Hudson, 113–122.

'Discoïd Beads', *Riv. Antrop.*, Vol. 48, 164–165.

Various Appendices on pedology to archaeological reports, and reviews.

INDIAN ARCHAEOLOGY

Professor: K. de B. Codrington, M.A. (A.T.)

Five students were registered for higher degrees as follows:—

Ph.D.

K. K. Sinha (Faculty of Arts): Culture Sequence of Northern India from 1,000 B.C.–100 B.C.

P. M. Prematilleke (Faculty of Arts): Sinhalese Sculpture of the Anuradhapura Period.

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M. L. Nigam (Faculty of Arts): The Antiquities of Bundelkhand.

H. A. Ratnayake (Faculty of Arts) (*part-time*): Arts and Crafts of Ceylon.

(The supervision of the work of this student was shared with Mr. H. W. M. Hodges).

M.A.

I. A. R. Naik (Miss) (Faculty of Arts): The culture of the Nilgiri Graves with its catalogue collection at the British Museum.

Miss d'Rosario worked for a year at the Institute on the history of art in preparation for attending the course for the Diploma in the History of Art at the Louvre.

Forty-eight students from the Institute, the School of Oriental and African Studies and University College took part in an expedition to Fairlight Cove and another expedition was undertaken to the National Pinetum, Bedbury.

PREHISTORIC EUROPEAN ARCHAEOLOGY

Professor: J. D. Evans, M.A., Ph.D., F.S.A. (*A.T.*)

Lecturer: F. R. Hodson, M.A., Ph.D.

Special Lecturer in Central and East European Archaeology: T. Sulimirski, Iur., D., Ph.D. (Lwow), Hon. F.S.A.

There were 14 students registered for the Diploma, of whom 8 were first year, 5 second year and 1 third year. The second and third year students all took the examination at the end of the year and successfully gained their Diplomas. There were also 7 occasional students in the Department, 1 full-time and 6 part-time. Teaching was also provided for 32 intercollegiate students. 10 students were registered for higher degrees, as follows:—

Ph.D.

D. Britton (Faculty of Arts) (*part-time*): Some aspects of the metal industry in Prehistoric Europe, especially in Britain.

R. R. Mackay (Faculty of Arts) (*part-time*): Aspects of the British Neolithic.

S. Mann (Miss) (Faculty of Arts) (*part-time*): The Neolithic Cultures of S. Italy.

H. Roberts (Mrs.) (Faculty of Arts): An inquiry into some styles of decoration in repoussé on objects of sheet bronze from early Etruscan tombs.

P. J. Ucko (Faculty of Arts): The Prehistoric Anthropomorphic Figurines of the Ancient Near East and the Aegean.

G. Rosselló (Faculty of Arts): The chronology of early Balearic Island cultures.

M.A.

D. C. Biernoff (Faculty of Arts): Painted pottery Neolithic cultures in Greece and West Anatolia.

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- I. Haglund (Miss) (Faculty of Arts): Aspects of the archaeology of Scandinavia in the Neolithic and Bronze Ages.
G. Pike (Mrs.) (Faculty of Arts): Land transport in the Western Mediterranean in pre-Roman times.
G. Putt (Miss) (Faculty of Arts): The Late Bronze Age in South-east England.

Of these, Mr. Ucko presented his thesis and was awarded the Ph.D. degree.

Dr. Hodson worked for some weeks in December 1962 and April 1963 at the Bernisches Historisches Museum on material from the Iron Age cemetery of Münsingen. Dr. Sulimirski gave a course of six lectures at the School of Slavonic and East European Studies in addition to his lectures at the Institute.

Publications:

By Professor Evans:

- 'La civilización de la islas malteras y sus relaciones con las demás culturas con arquitectura megalítica en la cuenca occidental del Mediterraneo', *Ampurias*, XXII-XXIII, 129-140.
'Cretan Cattle-cults and Sports', *Man and Cattle*, Occasional Paper No. 18 of the Royal Anthropological Institute of Great Britain and Ireland (1963), 138-143.
'A Marble Statuette bought in Malta and its Implications', *A Pedro Bosch-Gimpera en el septuagesimo aniversario de su nacimiento*, 1963, 161-166.

By Dr. Hodson:

- 'Some pottery from Eastbourne, the 'Marnians' and the pre-Roman Iron Age in Southern England'. *Proc. Prehist. Soc.*, 1962, 140-155.
'Les périodes de la Tène en Suisse et dans les Iles britanniques', *Celticum*, VI, 1963.

By Dr. Sulimirski:

- 'The Climate of the Ukraine during the Neolithic and the Bronze Age'. *Archaeologia*, Vol. XII, Warszawa 1961, 1-18.
'Copper Hoard from Horodnica on the Dniester'. *Mitteilungen d. Anthropologischen Ges. Wien*, Vol. XCI, 1961, 91-97.
'Eine Kobaner Prachtaxt von Winnitze, Ukraine'. *Mitteilungen d. Anthropologischen Ges. Wien*, Vol. XCII, 1962, 269-271.
'The Sarmatians in Poland' (in Polish). *XIIth Yearbook of the Polish Society of Arts and Science in London*, 1962, 65-93.
'Reiter der Steppe'. *Versunkene Kulturen*, Droemersch Verlaganstalt Th. Kaur Nachf., München-Zürich 1962, 279-298.

Several reviews.

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ARCHAEOLOGY OF THE ROMAN PROVINCES

Professor: S. S. Frere, M.A., V-P.S.A. (A.T.)

There were 11 students working in the Department, 5 of whom were registered for the Post-graduate Diploma. There was 1 Occasional student.

Students were registered for higher degrees as follows:—

Ph.D.

W. Manning (Faculty of Arts): Objects of Iron in Roman Britain.

M.A.

H. F. Cleere (Faculty of Arts): The Iron Industry in Roman Britain.

K. S. Painter (Faculty of Arts): Roman Glass.

B. H. Reed (Faculty of Arts): Late Romans and barbarian interaction.

During the year a Diploma was awarded to Mr. G. J. D. Little.

Regular courses of lectures have been given on Roman Britain and the Western Empire. The former were attended by a total of 14 Intercollegiate students.

The Professor also gave a number of outside lectures.

Professor Frere acted as external examiner for the Ph.D. degree at Leeds University.

Work has continued within the Department on the restoration of wall plaster from Verulamium and the Bignor villa (in which various Conservation students assisted); on the card index of Celtic coins; and on the card index of Romano-British art and objects.

The Professor led an expedition to Lezoux, France where a samian kiln was excavated. He also directed excavations for 5 weeks at Dorchester-on-Thames and for 2 weeks at the Iron Age Hill-fort of Ivinghoe Beacon, Bucks.

Publications:

'Excavations at Verulamium in 1961', *Antiquaries Journal* XLII, 148–59.

'Lopodunum', *Germania* 41, 153–5.

Various reviews.

Professor Frere also edited *Surrey Archaeological Collections*, LIX.

WESTERN ASIATIC ARCHAEOLOGY

Professor: Seton Lloyd, C.B.E., M.A., F.B.A., F.S.A., A.R.I.B.A. (A.T.)

Lecturer in Mesopotamian Archaeology: Miss Barbara Parker, O.B.E., F.S.A.

Lecturer in Palestinian Archaeology: Mr. P. J. Parr, M.A., F.S.A.

Special Tuition: Mrs. K. R. Maxwell-Hyslop, F.S.A. (R.T.)

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The number of full-time students in the Department was 15 of whom 10 were studying Mesopotamian archaeology, 3 Palestinian and 2 Iranian. Four students were reading for the Diploma in Mesopotamian, 1 for the Diploma in Palestinian and 1 for the Diploma in Iranian Archaeology.

Students were registered for higher degrees as follows:

Mesopotamia

Ph.D.

Mrs. H. Crawford (née Browne) (Faculty of Arts): Archaeology and history of Early Dynastic Period in Iraq.

T. A. L. W. Madhloom (Faculty of Arts): The chronological development of Neo-Assyrian Art.

M.A.

A. Q. H. Al-Tikriti (Faculty of Arts): Neolithic and Pre-Halaf periods of Mesopotamian archaeology.

Adil Naji (Faculty of Arts): Archaeology and history of Mesopotamia in the Akkadian period.

J. E. Wootton (Faculty of Arts): Mesopotamian art and architecture from the Protoliterate period to the Third Dynasty of Ur.

Palestine

Ph.D.

Mrs. Frances James (Faculty of Arts): Beth Shan at the beginning of the First Millennium B.C.

M.A.

R. Dajani (Faculty of Arts): The culture of Eastern Jordan from the seventh to the first centuries B.C.

A. Hadidi (Faculty of Arts): Eastern Jordan in the Hellenistic and Roman periods.

Iran

M.A.

P. H. Razavi (Miss) (Faculty of Arts): Achaemenian art in the Western Provinces.

Mrs. James was awarded the Ph.D. in June.

Tutorials were given for students at the School of Oriental and African Studies studying the Akkadian and Iranian languages.

Diploma students for the Palestinian Diploma attended a course in Hebrew at University College and in Biblical criticism at King's College.

Senior students of the Mesopotamian section attended the XIIth Rencontre Assyriologique in London during July.

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Publications

By Professor Lloyd:

Beycesultan Vol. I (Final publication of excavations for the British Institute of Archaeology at Ankara).

Mounds of the Near East (Rhind Lectures, Edinburgh University, 1962).

By Miss Parker:

'Economic Tablets from the Temple of Mamu at Balawat', *Iraq* XV, pt. 1.

By Mr. Parr:

'Le "Conway High Place" à Pétra: Une Nouvelle Interprétation' *Révue Biblique* LXIX, 64-79.

By Mrs. Maxwell-Hyslop:

'Bronzes from Iran in the Collections of the Institute of Archaeology, University of London' *Iraq* XXIV, 1962.

Review of Deshayes, 'Les Outils de bronze de l'Indus au Danube' in *Journal of Near Eastern Studies* XXII, 3, 1963, 207-210.

DRAWING AND SURVEYING

Lecturer: H. M. Stewart, B.A.

The number of students attending courses was:

Drawing: 32 (12 Diploma, 3 Higher Degree, 14 Conservation, 3 Occasional);

Surveying: 20 (12 Diploma, 3 Higher Degree, 5 Conservation).

During the annual Field Course in June, 1963, the planning of Stockton Earthworks, near Wylke, Wiltshire, was continued by students taking the course in Surveying.

In addition to work done for various departments of the Institute, services in drawing were provided to the following bodies: British Association for Field Experiments, Courtauld Institute of Art, Universities of Leeds and Oxford, Egypt Exploration Society, Wellcome Historical and Medical Museum, Department of Antiquities, Cyprus.

PHOTOGRAPHY

Lecturer: M. B. Cookson

Assistant: Mrs. M. V. Conlon

There were 20 students in the Department: 16 Diploma, 2 M.A., 1 M.Sc., and one lecturer from another School of the University. There were also 3 students in the second year course in Photography.

Production of lantern slides and prints for Institute Departments and for a few outside bodies showed an increase of 25%

REPORT OF THE DIRECTOR FOR THE SESSION 1962/63

The Department was visited more frequently this session than ever before except when the Institute was first opened at the present premises. The visits were both individual and in groups, and countries so represented included Poland, Denmark, Greece, Norway, France, Holland and U.S.A., with some taking advantage of the darkroom and laboratory facilities the Department was able to provide.

The photographic record of the Motya excavations at Sicily was again undertaken by the Lecturer. Other work included recording for the indexes of the Professor of the Archaeology of the Roman Provinces.

The following new equipment was acquired: an Envoy Enlarger with a Taylor Hobson/f4.5 Ental lens together with ancillary equipment.

CONSERVATION

Lecturer-in-Charge: Miss Ione Gedye, B.A., F.I.I.C.

Lecturer: H. W. M. Hodges, F.I.I.C. (R.T.)

Technician: A. Marshall

Thirty-three internal students attended courses in the Department, of whom 15 followed the Conservation course, 6 being in their second year. The remaining 18 were Diploma and higher degree students. In addition the Chief Chemist from the Archaeological Department of Pakistan came on the advice of the British Museum Research Laboratory for special training. Instruction in the use of modern materials in casting and moulding was provided for a teacher in another school of the University. As in previous years work of instructional value to students was undertaken for a number of museums and excavations.

The Department's thanks are again due to Dr. A. E. Werner, Keeper of the Research Laboratory of the British Museum, both for acting as external examiner and for help in many other ways. Thanks are due to Mr. S. Rees Jones of the Courtauld Institute for instructing second-year students in the technology of painting materials, to Mr. A. Rixon of the Palaeontology Department of the Natural History Museum for demonstrating the work of his department to second-year students and to Mr. C. A. Bateman of the Western Asiatic Department of the British Museum for his demonstration of the rolling of cylinder seals.

Miss P. Cannon, Mr. R. Clarke, Mr. A. Marshall, Mr. J. Price, Mr. D. Parish and Miss A. Plowden qualified for the Institute's Certificate in Conservation.

A number of students of the Department assisted with technical services during vacation periods as follows:—

Miss D. Hadjilazaro—Technical assistant to Lord William Taylour at Aghios Stephanos, Laconia.

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Miss A. Madeira—Technical assistant and draughtsman to Dr. B. S. J. Isserlin at Motya, Sicily.

Miss C. Stevens—Conservation work in the laboratory of the National Museum, Valetta.

Miss M. White and Miss P. Cannon—Conservation work at Winchester Museum.

Mr. J. Price—Technical Assistant and Photographer to Mr. J. Wachter at Cirencester.

Miss G. Woodhouse—Conservation work at Reading Museum.

Publications

By Mr. Hodges:

Various reviews.

CONSERVATION OF HISTORICAL MONUMENTS

Lecturer-in-Charge: W. A. Eden, M.A., F.S.A., F.R.I.B.A. (Theory of Architecture. The Law relating to Ancient Monuments and Historic Buildings).

Lecturers: H. M. Colvin, M.A., Hon. A.R.I.B.A. (Documentary Sources for the History of Architecture in England).

Mrs. M. P. G. Draper, B.A., F.S.A. (Palaeography).

S. E. Dykes Bower, M.A., F.S.A., F.R.I.B.A. (Diagnosis and Treatment of Structural Faults in Buildings).

R. G. Gilyard-Beer, M.A., F.S.A. (English Architecture, 597–1540).

Sir John Summerson, B.A., F.B.A., F.S.A., A.R.I.B.A. (English Architecture 1540–1840).

R. G. Wood, A.R.I.B.A. (Diagnosis and Treatment of Structural Faults in Buildings).

There were 9 students registered in the Department of whom 6 (3 second-year and 3 first-year) were candidates for the Post-graduate Diploma in the Conservation of Historical Monuments. One student attended the courses in English Architecture, 1450–1840, and Palaeography; one the second-year course in the Diagnosis and Treatment of Structural Faults in Buildings; three the course in English Architecture, 1540–1840, two on an Inter-collegiate basis.

During the session visits were arranged to the following buildings:—

the Banqueting Hall, Whitehall; the York Water Gate; Greenwich Hospital; St. Paul's Cathedral; Lancaster House; the Tower of London; the Houses of Parliament (Victoria and St. Stephen's Towers); Knole House; Cobham Hall; Castle Rising; the Chantry Priest's House; Westminster Abbey; Corfe Castle; Ixworth Abbey and Clare Priory.

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The Lecturer-in-charge continued work on his commentary on Vitruvius for the series *Studies in Architecture* edited by Professor Sir Anthony Blunt and Professor R. Wittkower. Work on the re-erection for the London County Council of the Inigo Jones Gateway at Holland Park was also begun under Mr. Eden's direction.

Mr. Colvin was engaged in seeing his work on the history of the King's Works through the press.

Mrs. Draper completed her work on the Parish of St. James's Westminster for the *Survey of London* Volumes XXXI and XXXII, which are due for publication in December, 1963.

A second, revised, edition of Sir John Summerson's *Architecture in England, 1540-1840* was published in 1963.

Mr. Dykes Bower was engaged, among other works, on the restoration of Christ Church Cathedral, Oxford, the Hall of St. John's College, Cambridge, and the river front of Magdalene College, Cambridge. He was also responsible for the decoration of the reredos at Gloucester Cathedral.

Mr. R. G. Wood was appointed Architect to the Church Commissioners.

LIBRARY

Librarian: Miss J. du Plat Taylor, F.S.A.

Assistant Librarian: Miss G. Talbot, M.A., A.L.A.

Collections Clerk: Miss J. Philips, B.A.

During term time the Library was nearly always filled to capacity, with a consequent slight drop in books lent.

The main effort of the Librarians was concentrated on entering the remainder of the pamphlets from the Childe Bequest, but this task is not yet finished.

During the autumn term, Saleh Wanis, a trainee librarian from Libya on a British Council scholarship assisted in the library for 4 months.

During the Easter vacation, the Librarian again directed a small party at Motya excavations.

Among the donations to the Library, mention should be made particularly of the large number of older archaeological books given by University College and by Mr. Henry Hodges; and of the number of new books received from Mrs. Biro.

The following is a summary of the additions made during the year:

<i>Books</i>	405	<i>Pamphlets</i>	367
Exchanged	61	Exchanged	20
Presented	156	Presented	324
Purchased	188	Purchased	23
<i>Periodicals</i>	290		
<i>Volumes bound</i>	241	<i>Lantern slides</i>	390

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Volumes lent totalled 3,549, the highest month being November (495), the lowest August (43). 58 works were borrowed from outside libraries and 20 lent.

The following have presented books, periodicals and pamphlets:

Dr. Adamson, Dr. F. R. Allchin; Mrs. Amiran; Dr. E. Anati; F. K. Annable; Society of Antiquaries of London; B. P. Belgium; Miss Louisa Bellinger; Mrs. Biro; G. C. Boon; Dr. J. Briard; British Archaeological Association; British School in Rome; J. Carswell; H. W. Catling; CIBA Review; H. Dunscombe Colt; Dr. I. W. Cornwall; Mrs. Cotton; Dr. J. D. Cowen; A. P. Detsicas; Companhia de Diamantes de Angola; Editor of *Discovery*; R. J. Drake; Miss M. S. Drower; Editor of *Endeavour*; Dr. Joan Evans; W. A. Evans; Dr. Per Fett; Dr. and Mrs. H. J. Franken; Professor S. S. Frere; Dr. P. R. Giot; Professor Glasbergen; Professor W. F. Grimes; Dr. D. B. Harden; Dr. H. Helback; H. W. M. Hodges; E. W. Holden; Dr. R. Hodson; Idaho State College Museum; Institute of Classical Studies; Institute of Historical Research; Dr. M. J. Jarrett; D. Kaye; Dr. K. M. Kenyon; J. Kirkman; London University, Goldsmiths' Librarian; University College, London; Marburg, Vorg. Seminar Der Philipp Univ.; Melbourne, Commonwealth Scientific & Industrial Research Organisation; Methuen Ltd.; F. D. McCarthy; Dr. Margaret Murray; Miss T. M. I. Newbould; Mr. C. D. P. Nicholson; Professor A. Nunez Jiminez; Dr. K. P. Oakley; Oxford University Press; P. J. Parr; Pennsylvania University Museum; Miss J. Philips; Dr. R. Pittioni; L. Prematilleke; E. Pyddoke; Lt.-Col. A. B. de Quincey; Miss K. M. Richardson; Professor J. R. dos Santos Júnior; R. Cunliffe Shaw; R. Silva; Smithsonian Institute; H. M. Stewart; Dr. T. Sulimirski; Swan's Tours Ltd.; Miss G. C. Talbot; Miss J. du Plat Taylor; W. E. Taylor; Miss O. Tufnell; E. Uphill; Miss M. Varese; Victoria & Albert Museum; T. Vimalananda; T. Wahby; Sir Mortimer Wheeler; E. S. Wood; Mrs. Young; Professor F. E. Zeuner.

STUDENTS' APPOINTMENTS

Miss P. A. Cannon was appointed a Technical Assistant in the Egyptian Department of the British Museum.

Mr. R. J. Clarke was appointed Technical Assistant to Dr. Leakey at the Coryndon Museum, Nairobi.

Miss A. Hicks was appointed a Senior Library Assistant in the University of London Library.

Miss G. Joysmith was appointed Technical Assistant to the Scientific Officer of the National Museum, Mexico City.

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Miss M. E. McGregor was established in her post in the Western Asiatic Department of the British Museum.

Miss M. J. Mountain was appointed an Assistant Lecturer in the Department of Prehistoric Archaeology at Edinburgh University.

Mr. D. A. Parish was appointed Technical Assistant in Newbury Museum.

Miss A. Searight was awarded a fellowship by the British School of Archaeology in Iraq in order to work on the restoration of Nimrud ivories in the field and at Baghdad.

Miss S. N. Shaw was awarded a fellowship by the British School of Archaeology in Iraq in order to work on the restoration of Nimrud ivories in the field and at Baghdad.

Dr. G. J. Wainwright was appointed an Assistant Inspector of Ancient Monuments in the Ancient Monuments Branch of the Ministry of Public Building and Works.

Miss H. P. Williams was established in her post in the Research Laboratory of the British Museum.

Miss S. Wormwell was appointed temporary technical assistant to Dr. Norman Davey in his work on Roman wall-plaster.

UNIVERSITY OF LONDON

INSTITUTE OF ARCHAEOLOGY

Twenty-first
ANNUAL REPORT

1 August 1963 – 31 July 1964

INSTITUTE OF ARCHAEOLOGY

COMMITTEE OF MANAGEMENT

THE VICE-CHANCELLOR (Dr. P. S. Noble)

THE CHAIRMAN OF CONVOCATION (Dr. C. F. Harris)

THE PRINCIPAL (Sir Douglas Logan)

The Director of the Institute (Professor W. F. Grimes)

The Director of the Courtauld Institute of Art (or other representative) (Dr. G. Zarnecki)

The Director of the Institute of Classical Studies (Dr. D. R. Dicks)

The Director of the Warburg Institute (Professor E. H. J. Gombrich)

The President of the Council for British Archaeology (or other representative) (Dr. D. B. Harden)

The President of the Prehistoric Society (or other representative) (Dr. J. D. Cowen)

The President of the Society of Antiquaries of London (or other representative) (Sir Mortimer Wheeler)

Recognised or Appointed Teachers in cognate subjects, or Heads of Schools or Institutes in the University:—

Professor K. de B. Codrington

Sir John Lockwood

Professor P. E. Corbett

Professor F. Norman

Professor W. B. Emery

Professor A. H. Smith

Professor C. Daryll Forde

One vacancy

Two members of the Academic Staff nominated by the Academic Board:—

Professor J. D. Evans

Professor S. S. Frere

Five other persons;—

Mr. R. L. S. Bruce-Mitford

Dr. E. G. M. Fletcher

Professor J. G. D. Clark

Professor D. McKie

One vacancy

Sir John Lockwood acted as Chairman and Professor F. Norman as Deputy Chairman throughout the Session.

REPORT OF THE DIRECTOR FOR THE SESSION 1963/64

ADMINISTRATION

Director: Professor W. F. Grimes, C.B.E., M.A., D.Litt., F.S.A., F.M.A. (A.T.)*

Secretary and Registrar: E. Pyddoke, F.S.A.

Director's Secretary: Mrs. M. Hunt

Chief Clerk: Miss M. F. Varese

Senior Clerk: Miss H. I. Fuller

Clerks: Mrs. J. A. Karayiannis

Miss M. Exton

Staff matters

The Institute suffered a heavy loss in the death of Professor F. E. Zeuner in November, 1963. Professor Zeuner had been associated with the Institute since the early days in 1935, first as an Honorary Lecturer and then as part-time and, from 1952, full-time Professor of Environmental Archaeology. To Professor Zeuner is due the unique development of the Department of Environmental Archaeology in the Institute, which through his personality and achievement as a scholar enjoyed an international reputation.

Dr. G. W. Dimbleby was appointed to the Chair of Human Environment in succession to Professor Zeuner, to take effect from the beginning of the 1964-5 session.

The Director continued to serve as Chairman of the Council for British Archaeology Committees on Ancient Fields and on Industrial Archaeology, the London Topographical Society, the Finance and Administrative Committee of the Field Studies Council, and the Faculty of Archaeology, History and Letters of the British School at Rome. He was President of the Cambrian Archaeological Association and Vice-President of the Council for British Archaeology and of the Society for Medieval Archaeology. He represented the University on the Roman and Mediaeval London Excavation Council and was appointed Honorary Treasurer of the Council for British Archaeology. He represented the University at the VIIIth International Congress of Classical Archaeology in Paris in September.

Professor Seton Lloyd lectured at Teheran by the invitation of the British Institute of Persian Studies. Mr. Parr represented the Institute at the VIIIth International Congress of Classical Archaeology in Paris and read a paper on Petra. Miss Parker and Mrs. Maxwell Hyslop attended the XIIIth Rencontre Internationale Assyriologique in Paris.

Professor Frere was elected a Corresponding Member of the German Archaeological Institute.

*A.T. Appointed Teacher, R.T. Recognised Teacher of the University of London, throughout.

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In June Dr. Cornwall was appointed Reader in the Department of Human Environment, the appointment to date from 1st October, 1964.

Dr. Sulimirski made two study-visits to northern and eastern Europe, in August-September 1963 and April-May 1964, visiting amongst other places, Copenhagen, Stockholm, Leningrad, Moscow, Budapest, Bucharest and Wroclaw. While in Poland he lectured on Western and Central European Archaeology.

Visiting Scholars

Professor Irving Rouse (Yale University) spent the whole of the session at the Institute. Dr. Jiri Neustupny (Czechoslovakia) gave two seminars in the course of a brief visit in March.

Professor F. Bordes (Bordeaux University) was the guest of the Institute when he participated in a meeting of the Research Seminar and in addition gave a seminar for the Prehistoric and Environmental Departments.

Public Lectures and Exhibitions

Professor Seton Lloyd delivered an Inaugural Lecture in the autumn term, taking as his subject 'Anatolia: an Archaeological Renaissance'.

A total of 16 public lectures was given during the session.

Dr. Kurt Bittel delivered three Special University Lectures under the general title of 'Archaeological Problems of Hittite Asia Minor' during the spring term with attendances which averaged 95.

Other public lectures covered a wide variety of archaeological subjects and audiences averaged 104. The lecturers included Professor S. Marinatos (University of Athens) (in collaboration with the Institute of Classical Studies), Professor J. D. Evans, Mr. R. J. Rodden (Cambridge and Harvard Universities), Miss J. du Plat Taylor, Mr. E. S. Higgs (Cambridge University), Mr. James Mellaart (University of Istanbul), Professor Irving Rouse (Yale University), Dr. B. S. J. Isserlin (University of Leeds), Mr. Roger Summers (National Museum of Southern Rhodesia), Dr. Bridget Allchin and Professor K. de B. Codrington.

In February 1964 an exhibition of drawings of wall paintings from Çatal Hüyük was staged in the entrance hall; it was followed in April by an exhibition of Mediaeval Pottery arranged in connexion with a conference organised by the Council for British Archaeology. At the end of the session a small exhibition of students' photographic work was held.

The Institute continued to co-operate with the Extra-Mural Department in teaching for the University Extension Diploma in Archaeology. Several of the courses were again held in the building and were given by, among others, three members of the staff, Miss J. M. Sheldon, Mr. J. Williams and Dr. A. Rosenfeld, and by

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past and present students, Dr. V. Seton Williams, Miss E. Horrocks, Dr. G. Wainwright and Mr. G. Jarvis. The Director and Miss Barbara Parker acted as External Examiners.

Students

The total number of students registered at the Institute during the session was 118: besides these 68 Intercollegiate students attended courses. Of those at the Institute 34 were registered for Diplomas, 42 for Higher Degrees (29 full-time and 12 part-time), 4 for special research under Statute 21 (iii) (2 full-time and 2 part-time) and 3 for the Course on the Conservation of Historical Monuments. Eleven Occasional students attended lectures and used the facilities of the Institute and 3 students attended courses as full-time Occasional students.

Five students were awarded the Diploma in European Archaeology (Section A: Prehistoric Europe), three the Diploma in European Archaeology (Section B1: Iron Age and Roman Provinces), one the Diploma in Prehistoric Archaeology, four the Diploma in Western Asiatic Archaeology (one with Distinction) and one the Diploma in Palestinian Archaeology.

Of the 41 Higher Degree students 11 were registered for the Ph.D full-time (3 in the Faculty of Science) and 7 part-time. Sixteen were registered for the M.A. full-time and 4 part-time. Three were registered for the M.Sc., one of them part-time.

Eight students qualified for the Institute's internal Diploma in Conservation and Technology and 2 for the internal Diploma in the Conservation of Historical Monuments.

The following overseas countries were represented among students registered at the Institute: Australia, 2; Belgium, 2; Canada, 1; Ceylon, 3; Ghana, 1; Greece, 2; India, 5; Iran, 1; Iraq, 2; Jordan, 1; Malaysia, 1; New Zealand, 2; Nigeria, 1; Northern Rhodesia, 1; Pakistan, 1; Poland, 1; Sweden, 2; Switzerland, 1; Trinidad, 1; U.S.A., 11; West Germany, 1.

Teaching Collections

Dr. Suliminski presented a selection of prehistoric sherds from eastern European countries acquired during his travels.

Gordon Childe Prize and Bequest Fund

Gordon Childe Prizes for 1963/64 were awarded to Mr. J. D. Hawkins, who obtained the Post-graduate Academic Diploma in the Archaeology of Western Asia with Distinction, and Miss M. A. White, who was awarded the Institute's Diploma in the Conservation of Antiquities.

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Grants from the Bequest Fund were made to Professor Frere to assist him to continue with his work at Lezoux in Central France, where he is excavating Samian pottery kilns; to Miss J. du Plat Taylor, for equipment required for the expedition to Motya; to Mr. James Mellaart, towards the cost of his excavation at Çatal Hüyük; and to Mr. H. W. M. Hodges, to enable him to visit Turkey.

Margary Fund

Grants were made to fourteen students to assist them with travelling expenses for various projects. Five went to Greece, four to take part in an excavation in the Cyclades and one at Mycenae; one visited sites and museums in South Sweden and Denmark; three went to Turkey to take part in the excavation at Çatal Hüyük; two went to Russia to visit sites and museums; one went to take part in an excavation in Jordan, another to one in Israel, and a third to one in France.

TEACHING AND RESEARCH

Institute Field Course

The field course was again held at Druid's Lodge, through the kindness of Messrs Felix Fenston and R. Turpin, after examinations at the end of June. The course was under the general supervision of the Director, and as in previous years Professor Evans, Dr. Cornwall, Dr. Hodson, Mr. Cookson and Mr. Stewart participated in the work. Thanks are due once again to Dr. M. J. Aitken of the Oxford University Laboratory for Archaeology and the History of Art, and to Mr. Antony Clarke, who demonstrated magnetic and electrical prospecting devices for use in archaeological field work. No excavation was attempted this year, but with the kind permission of Messrs. N. Yeatman-Biggs and M. Stratton field-exercises were undertaken at Stockton Earthworks and elsewhere. Mr. Pyddoke again accepted responsibility for the administration, in which he was assisted by Mrs. Cookson and Mrs. Barton.

Research Seminar in Archaeology and Related Subjects

During the past year the Seminar met three times. Two of these meetings were held as usual in the late afternoon when one paper was discussed, while the third meeting was the Seminar's first day-meeting.

At the first meeting of the year the uses and abuses of statistics in archaeology (Dr. C. B. M. McBurney) were discussed. It was a result of the interest shown in this subject and the fact that discussion was still in full spate when the meeting had to be closed that it was decided to organise a whole day's meeting to discuss the relationship of Archaeology and Statistics.

For this day meeting the Seminar's custom of circulating papers before the actual meeting was carried on. In all, four papers were circulated. For each paper

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there was a different chairman, which helped to reflect the different emphasis on statistics in the various fields of archaeology. The day meeting of the Seminar was honoured by the presence of Professor F. Bordes (Bordeaux) whose paper on the use of statistics in the palaeolithic archaeology of France opened the meeting (Chairman: Professor N. A. Barnicot). After coffee the emphasis moved to considering the actual methods used by Mr. D. A. Roe for his analyses of Lower Palaeolithic hand-axes (Chairman: Dr. J. d'A, Waechter). The afternoon session was opened by Dr. C. B. M. McBurney's paper dealing with multivariate change in palaeolithic industries when discussion was led by Professor Irving Rouse who brought into focus several of the statistical techniques employed by American archaeologists. The last formal paper was concerned with Iron Age material (Chairman: Professor J. D. Evans) in the course of which Dr. F. R. Hodson made admirably clear many of the difficulties of defining objective criteria on which to base typological analysis. After tea Professor R. J. C. Atkinson faced the arduous task of summarising and commenting on the day's discussions. Before connecting up the different threads of discussion and emphasising the points which seemed to him to be the most important results of the discussion, Professor Atkinson summarised the difficulties and results of his own statistical analyses of archaeological artifacts. Both the number of people who attend throughout this day-meeting and the comments received afterwards by the Secretary suggest that day-meetings devoted to the full discussion of a particular topic of interest to archaeologists should be an important function of this Seminar. The success of this meeting also raised the question whether the papers and discussion at such meetings should not, in some way, be made available to a wider audience.

At the second meeting of the year, Mr. H. W. M. Hodges addressed the Seminar on technological factors influencing pottery traits and, under the chairmanship of Mr. H. S. Smith, discussion was centred on the acute problem of deciding what exactly the archaeologist is classifying when he constructs a pottery typology.

The thanks of the Institute are due to Dr. P. J. Ucko, who undertook the very considerable task of organising these meetings, which have been an important and valuable element in the Institute's activities during the session.

Motya

Participation with Leeds University in the expedition to Motya was continued. In the summer vacation Miss Taylor again acted as co-Director with Dr. Isserlin of Leeds University and Mr. Cookson was again responsible for the photography.

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THE DEPARTMENTS

The Director's general introductory course on archaeology was attended by 25 intercollegiate students.

He continued work on the results of his excavations in the City of London and as consultant for the preservation and treatment of London Wall and its related features.

He also gave a number of outside lectures.

Publications:

By Mr. Pyddoke:

The Scientist and Archaeology (edited), Phoenix, 1963, 208 pp.

What is Archaeology?, John Baker, 1964, 64 pp.

REORGANISATION OF DEPARTMENTS

The Senate of the University accepted in March a proposal from the Committee of Management of the Institute that the functions and titles of the Departments of 'Prehistoric European Archaeology' and of 'Environmental Archaeology' should be re-defined. The former was re-named the Department of Prehistoric Archaeology; the latter the Department of Human Environment.

The changes were rendered necessary in order to clarify the responsibilities and scope of the departments. The removal of the 'European' limitation enables the Department of Prehistoric Archaeology to deal with students engaged on the archaeology of non-European areas such as Africa, placing of whom has presented difficulty in the past. The indications are that there will be a growing number of applicants in these fields as they develop. The title 'Human Environment' conveys more accurately than 'Environmental Archaeology' the responsibility of the department for teaching and research in environmental studies over the full range of the archaeological past. The purely archaeological teaching which formerly was provided by the Department of Environmental Archaeology has now been transferred to the Department of Prehistoric Archaeology.

Since these changes would not become fully effective until the beginning of the 1964-5 session the old titles and dispositions have been retained in the present Report.

ENVIRONMENTAL ARCHAEOLOGY

Professor: F. E. Zeuner, Ph.D., D.Sc., F.S.A. (*A.T.*) (deceased November 5th, 1963)

Lecturers: I. W. Cornwall, Ph.D. (*R.T.*)

J. d'A. Waechter, Ph.D., F.S.A. (*R.T.*)

Assistant: Miss J. M. Sheldon

Honorary Assistant: Mrs. M. Barton

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The number of students working in the Department during the year was 20, 7 being registered for the Ph.D., 3 for the M.Sc., 5 for the M.A., 3 for the Post-graduate Diploma in Prehistoric Archaeology and 2 for research under Statute 21 (iii).

Of the Higher Degree students, 5 were registered in the Faculty of Science and 8 in the Faculty of Arts. They worked on the following subjects during the session:

Ph.D.

C. Banks, Mrs. (*née* Grigson) (Faculty of Science): Prehistoric cattle remains from Europe and India.

C. W. P. Jarvis (*part-time*) (Faculty of Arts): Sites in the Lea Valley.

D. Mathewson (Faculty of Arts): Weathering processes on archaeological objects.

G. Naylor (Faculty of Science): Palaeoclimatology.

A. C. Patel (Faculty of Science): Loess sites in Europe.

B. Rosselló, Mrs. (Faculty of Arts): Geographical and chronological distribution of signs in Palaeolithic art.

J. L. Williams (*part-time*) (Faculty of Arts): Technology of prehistoric pottery.

M.Sc.

R. W. Andrews (*part-time*) (Faculty of Science): British varved clays.

J. G. Evans (Faculty of Science): Land and fresh-water mollusca from Post-glacial sediments.

S. Limbrey, Miss (Faculty of Science): Radioactivity methods in archaeology.

M.A.

A. Akeroyd, Miss (Faculty of Arts): Sea-levels in relation to archaeological sites.

M. A. B. Harlow (*part-time*) (Faculty of Arts): Environmental aspects of North African rock-drawings.

R. S. Land (*part-time*) (Faculty of Arts): Oceanic, Polynesian (Maori) culture sequence.

V. N. Rana-Sisodia (Faculty of Arts): Faunal remains from Indian sites.

M. J. Tamplin (Faculty of Arts): Middle Thames brickearths.

Statute 21 (iii)

A. C. Western, Miss (*part-time*): Identification of wood from archaeological sites.

B. Westley, Mrs. (*part-time*): Faunas from archaeological sites.

Mr. Patel presented his thesis during the session and was awarded the Ph.D.

Mr. Andrews was awarded the M.Sc. degree.

Mr. J. Chaplin was successful at the Post-graduate Diploma examination in June, 1964.

Owing to the death, early in the session, of Professor Zeuner, Dr. Cornwall took charge of the Department until the appointment of the new Professor. Because of the

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consequent unforeseen amount of teaching and supervision falling on him and Miss Sheldon, research work in the soil-laboratory came to a standstill.

Dr. Cornwall participated in the work of the British Association Sub-Committee on Field Experiments (of which he is a member) at Overton Down and Wareham Heath. Miss J. T. Philips and Mrs. B. Westley also took part in this operation.

Dr. Cornwall gave a number of outside lectures and demonstrations.

Publications:

By Dr. Cornwall:

The World of Ancient Man, Phoenix House, London, 1964. 271 pp.

'Soil-science helps the archaeologist' in E. Pyddoke (ed.), *The Scientist and Archaeology*, 31-55, Phoenix House, London, 1963.

'Soil, stratification and environment' in D. Brothwell and E. Higgs (ed.), *Science in Archaeology*, 113-122, Thames and Hudson, London, 1963.

INDIAN ARCHAEOLOGY

Professor: K. de B. Codrington, M.A. (*A.T.*)

One student was registered for the Post-graduate Academic Diploma.

Seven students were registered for higher degrees as follows:—

Ph.D.

K. K. Sinha (Faculty of Arts): Culture Sequence of Northern India, 1,000 B.C.-100 B.C.

P. M. Prematilleke (Faculty of Arts): Sinhalese Sculpture of the Anuradhapura Period.

M. L. Nigam (Faculty of Arts): The Antiquities of Bundelkhand.

I. A. R. Naik (Miss) (Faculty of Arts): The culture of the Nilgiri Graves with its catalogue collection at the British Museum.

T. C. Sharma (Faculty of Arts): Prehistoric Archaeology (title to be agreed).

H. A. Ratnayake (Faculty of Arts) (*part-time*): Arts and Crafts of Ceylon.

(The supervision of the work of this student was shared with Mr. H. W. M. Hodges).

M.A.

H. Manzur (Faculty of Arts): Bengal Terra Cotta (title to be agreed).

Of these, Mr. Sinha presented his thesis and was awarded the Ph.D. degree.

Throughout the long vacation Professor Codrington was in India, where he was able to complete the first part of his report on the Caves of Ellora. He also visited the University of Baroda, where the departments of Geography and Archaeology have undertaken to carry out a survey of the River Mahi. He later went to Delhi, where he discussed a number of points bearing upon the training of archaeologists and art historians.

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PREHISTORIC EUROPEAN ARCHAEOLOGY

Professor: J. D. Evans, M.A., Ph.D., F.S.A. (A.T.)

Lecturer: F. R. Hodson, M.A., Ph.D., F.S.A.

Lecturer in Central and East European Archaeology: T. Sulimirski, Iur.D., Ph.D. (Lwow), Hon. F.S.A.

Ten full-time students were registered for the Diploma at the beginning of the Session. Of these 6 were in their second year and 4 in their first year. Five of the second-year students sat the examination and were successful in gaining their Diplomas. There was 1 full-time occasional student; 2 students registered for research under Statute 21 (iii) and teaching was also provided for 32 intercollegiate students.

One of the first-year Diploma students, Miss I. Davies, transferred to M.A. during the course of the session and there were also 10 other students registered for higher degrees, as follows:

Ph.D.

G. Watling (Mrs.) (*née* Putt) (Faculty of Arts): The Late Bronze Age in Southern England.

D. C. Biernoff (Faculty of Arts): Painted Pottery Neolithic Cultures of Greece and West Anatolia.

G. Rosselló (Faculty of Arts): The Chronology of early Balearic Island Cultures.

D. Britton (*part-time*) (Faculty of Arts): Some aspects of the metal industry in Pre-historic Europe, especially in Britain.

S. Mann (Miss) (*part-time*) (Faculty of Arts): The Neolithic Cultures of South Italy.

M.A.

W. Phelps (Faculty of Arts): Southern Greece in the Early Bronze Age.

C. Gallis (Faculty of Arts): Neolithic and Bronze Ages in Greece.

R. C. Reed (Faculty of Arts): European Archaeology (title to be agreed).

G. Pike (Mrs.) (Faculty of Arts): Land Transport in the Western Mediterranean in pre-Roman times.

I. Haglund (Miss) (Faculty of Arts): Aspects of the archaeology of Scandinavia in the Neolithic and Bronze Ages.

Mrs. Pike presented her thesis during the year and was awarded the M.A. degree.

During July and August 1964 Professor Evans excavated, in collaboration with Mr. C. Renfrew, a Neolithic settlement-site on the island of Saliagos, near Antiparos, Cyclades.

Professor Evans acted as external examiner for Birmingham University and Dr. Hodson as external examiner for Cambridge University. All members of the Department gave a number of outside lectures.

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Publications:

By Professor Evans:

'The Dawn of Human Society', Chapter 1 of M. Douglas (ed.), *Man in Society, Patterns of Human Organisation*, Macdonald Illustrated Library, Vol. 6, 16-27.

Various reviews.

By Dr. Hodson:

'Les Periodes de la Tène en Suisse et les Iles Britanniques', *Celticum VI*, 1963, 75-80.

By Dr. Sulimirski:

'The Forgotten Sarmatians', *Vanished Civilisations*, Thames & Hudson, 1963, 279-298.

'Sarmatians in the Polish Past', *The Polish Review*, Vol. IX, New York, 1964, 13-66.

'Cimmerians', *Encyclopaedia Britannica*, 1963, Vol. 5, 773.

ARCHAEOLOGY OF THE ROMAN PROVINCES

Professor: S. S. Frere, M.A., V-P.S.A. (A.T.)

There were 12 students working in the Department, 9 of whom were registered for the Post-graduate Diploma.

The following were reading for Higher Degrees:

Ph.D.

W. Manning (Faculty of Arts): Objects of iron in Roman Britain.

M.A.

H. F. Cleere (Faculty of Arts): The iron industry in Roman Britain.

K. S. Painter (Faculty of Arts): Roman glass.

During the year Diplomas were awarded to Mr. B. Eagles, Mr. P. Langmaid and Miss M. Pearce.

Regular courses of lectures have been given on Roman Britain and on the Western Empire. The former were attended by a total of 5 inter-Collegiate students.

Professor Frere acted as external examiner in archaeology at Leicester University; he also gave a number of outside lectures.

Work was continued within the Department on the restoration of wall plaster from Verulamium and the Bignor villa; on the card index of Celtic coins; and on the card index of Romano-British art and small objects.

Professor Frere led an expedition to Lezoux, France, where two Roman sites were excavated, and directed a three-week excavation at the Iron Age hillfort at Ivinghoe Beacon, Bucks.

Mr. M. Hassall, a student in the Department, directed an excavation for two weeks at Dorchester-on-Thames.

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Publications:

By the Professor:

'Excavations at Dorchester-on-Thames', *Archaeological Journal* CXIX, 114-49.

'Verulamium, Three Roman Cities', *Antiquity* XXXVIII, 103-112.

'A Romano-British Relief from Keisby, Lincs.', *Antiquaries Journal* XLIII, 292.

Various reviews.

Surrey Archaeological Collections, Vol. LX (edited).

WESTERN ASIATIC ARCHAEOLOGY

Professor: Seton Lloyd, C.B.E., M.A., F.B.A., F.S.A., A.R.I.B.A. (*A.T.*)

Lecturer in Mesopotamian Archaeology: Miss Barbara Parker, O.B.E., F.S.A.

Lecturer in Palestinian Archaeology: Mr. P. J. Parr, M.A., F.S.A.

Seminar in Metallurgy and Metal Typology, and Special Tuition: Mrs. K. R. Maxwell-Hyslop, F.S.A.

The number of full-time students in the Department was 16, of whom 10 were studying Mesopotamian Archaeology, 5 Palestinian and 1 Iranian. Six students were reading for the Diploma in Mesopotamian, 4 for the Diploma in Palestinian Archaeology.

Students were registered for Higher Degrees as follows:—

Mesopotamia

Ph.D.

T. A. L. W. Madhloom (Faculty of Arts): The Chronological development of Neo-Assyrian Art.

M.A.

J. E. Wootton (Faculty of Arts): Mesopotamian art and architecture from the Proto-literate period to the Third Dynasty of Ur.

A. Q. Al-Tikriti (Faculty of Arts): Neolithic and Pre-Halaf periods of Mesopotamian archaeology.

C. L. Goff (Miss) (Faculty of Arts): Regional antecedents of the Luristan culture.

Palestine

M.A.

R. Dajani (Faculty of Arts): The culture of eastern Jordan from the seventh to the first centuries B.C.

A. Hadidi (Faculty of Arts): Eastern Jordan in the Hellenistic and Roman periods.

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Iran

P. H. Razavi (Miss) (Faculty of Arts): Achaemenian art in the Western Provinces.

Mr. J. D. Hawkins, Miss D. Collon, Mrs. L. Glyn-Davies, Dr. D. P. Adamson and Miss K. Wright were awarded the Academic Post-graduate Diploma. Mr. Hawkins, who completed the course in two years instead of the more normal three, was awarded a mark of Distinction.

Tutorials were given for students studying the Akkadian and Iranian languages at the School of Oriental and African Studies. Students for the Mesopotamian and Palestinian Diplomas attended courses in Hebrew at University College.

Under the auspices of the British Institute of Archaeology at Ankara, of which he is currently Honorary Secretary, the Professor conducted an archaeological reconnaissance in the Urartu area of eastern Turkey, with a view to choosing a fortress site for excavation in 1965. This was successful.

Miss Parker obtained leave of absence for the period from January to March, 1964 to take part in the excavations of the British School of Archaeology in Iraq at Tell Rimah.

Mr. Parr continued his excavations at Petra, under the auspices of the British School of Archaeology in Jerusalem.

Mrs. Maxwell-Hyslop was awarded a grant from the Oxford Near Eastern Fellowship Fund, to continue her work on Western Asiatic gold jewellery. She worked in the Louvre and the Museum of Saint Germain-en-Laye.

Publications:

By Professor Lloyd:

World Architecture, Paul Hamlyn, 1963 (Collaboration), 16-79.

Various reviews.

By Mr. Parr:

'Three Altars from Petra', *Annual of the Department of Antiquities of Jordan* VI-VII 1962, 13-20.

'A Nabatean Sanctuary near Petra', *ibid*, 21-23.

By Mrs. Maxwell-Hyslop:

'A note on the significance of the technique of "casting-on" as applied to a group of daggers from northwest Persia' (with H. M. Hodges), *Iraq* XXVI, I, 1964, 50-53.

DRAWING AND SURVEYING

Lecturer: H. M. Stewart, B.A.

The number of students attending courses was:

Drawing: 42 (18 Diploma, 18 Conservation, 3 Higher Degree, 3 Occasional);

Surveying: 41 (18 Diploma, 18 Conservation, 2 Higher Degree, 3 Occasional).

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In addition one lecture was given to Extra-mural students on the drawing of pottery, and private tuition to individuals intending to assist at excavations.

During the annual Field Course the general survey of Stockton earthwork was continued, all students taking part. To this end the syllabus had been rearranged, when necessary, so that Surveying should occupy the first rather than the second year.

PHOTOGRAPHY

Lecturer: M. B. Cookson

Assistant: Mrs. M. V. Conlon

Thirty-two students took photographic courses, 24 Diploma and 8 Conservation, with 4 Conservation students electing to continue with photography in their second year.

Production of lantern slides and prints for Institute Departments increased by 25% over the previous session.

The lecturer gave three lectures to outside bodies on archaeological photography and students made a visit to the London College of Printing to see line and half-tone block-making.

Though not quite as numerous as in the past, visitors from France, Holland, U.S.A., Belgium, Israel and Greece inspected the Department during the session.

The photographic recording of the Motya (Sicily) excavations was again carried out by the lecturer.

Items of new equipment included four Gandolphi cameras identically fitted for use in the studio for teaching purposes.

CONSERVATION

Lecturer-in-Charge: Miss Ione Gedye, B.A., F.I.I.C.

Lecturer: H. W. M. Hodges, F.I.I.C. (R.T.)

Technician: A. Marshall

Sixty-three internal students attended courses in the Department of whom 21 followed the Conservation course, 8 being in their second year. The remainder were Diploma and Higher Degree students.

As in previous years, work of instructional value to students was undertaken for a number of museums and excavations.

The Department's thanks are again due to Dr. A. E. Werner, Keeper of the Research Laboratory of the British Museum, both for acting as external examiner and for help in other ways; to Mr. S. Rees Jones of the Courtauld Institute for instructing second-year students in the technology of painting materials; and to Mr. Baynes-Cope of the Research Laboratory of the British Museum for instructing second-year students in the technology, decay and conservation of paper.

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Miss D. Hadjilazaro, Miss A. Madeira, Miss H. Pickering, Miss C. Stevens, Miss M. White, Miss G. Woodhouse and Mr. J. Yasi obtained the Diploma in Conservation. Miss Hadjilazaro, Miss Madeira and Miss Woodhouse were given a mark of distinction.

Miss Gedye and Mr. Hodges lectured on the conservation and examination of pottery for an Extra-mural course. Miss Gedye, Mr. Hodges and Mr. Marshall lectured in the Museums' Association Technical Course for students specialising in Fine Decorative Arts.

Mr. Hodges spent two months in Turkey as adviser on Conservation to the Hittite Museum, Ankara, where he also designed a laboratory. He continued in his post as Secretary of Section H of the British Association.

Miss Gedye and Mr. Hodges continued as Secretary and Treasurer respectively of the United Kingdom Group of the International Institute for Conservation and with their work as abstractors of the technical literature of art and archaeology for the International Institute for Conservation.

Students from the Department assisted with technical services on more than a dozen archaeological sites and excavations during vacation periods. In addition to sites in England (Winchester, High Lodge (Mildenhall), Verulamium) they worked in museums or for expeditions in Switzerland (Berne), Greece (Antiparos, Mycenae), Sicily (Motya), Italy (Rome, Talamone, Francolise), Turkey (Ankara, Can Hassan).

Publications:

By Mr. Hodges:

Artifacts, John Baker, 1964, 237 pp.

'Pottery in Thin Section', in E. Pyddoke (ed.), *The Scientist and Archaeology*, Phoenix, 1963, 101-110.

CONSERVATION OF HISTORICAL MONUMENTS

Lecturer-in-Charge: W. A. Eden, M.A., F.S.A., F.R.I.B.A. (Theory of Architecture. The Law relating to Ancient Monuments and Historic Buildings).

Lecturers; (part-time) H. M. Colvin, M.A., Hon. A.R.I.B.A. (Documentary Sources for the History of Architecture in England).

Mrs. M. P. G. Draper, B.A., F.S.A. (Palaeography).

S. E. Dykes Bower, M.A., F.S.A., F.R.I.B.A. (Diagnosis and Treatment of Structural Faults in Buildings).

R. G. Gilyard-Beer, M.A., F.S.A. (English Architecture, 597-1540).

Sir John Summerson, B.A., F.B.A., F.S.A., A.R.I.B.A. (English Architecture, 1540-1840).

REPORT OF THE DIRECTOR FOR THE SESSION 1963/64

R. G. Wood, A.R.I.B.A. (Diagnosis and Treatment of Structural Faults in Buildings).

There were 3 students registered in the Department all of whom were candidates for the Post-graduate Diploma in the Conservation of Historical Monuments. Two students attended the course in English Architecture, 597-1540 on an Inter-collegiate basis.

Visits were arranged during the session to the following buildings, among others:- Houses of Parliament, Victoria Tower; Westminster Hall (roof repairs and repairs to flèche); Metal Workshops of the Ministry of Public Building and Works; Bishop's House, Ely; Hartlebury Castle; St. Vedast, Foster Lane; Westminster Abbey and Magdalene, Trinity, St. John's, King's, Jesus and Sidney Sussex Colleges, Cambridge.

Work on the re-erection for the London County Council of the Inigo Jones Gateway at Holland Park was completed, and the adaption of Manresa (Parkstead) House, Roehampton, for use as a Training College was begun under the direction of the Lecturer-in-Charge, who also continued his work on Vitruvius. Vols. I and II of *The King's Works* were published under the general editorship of Mr. Colvin. Mrs. Draper was engaged in work on the Parish of St. Ann's, Soho, for the *Survey of London*, Volume XXXIII.

LIBRARY

Librarian: Miss J. du Plat Taylor, F.S.A.

Assistant Librarian: Miss G. Talbot, M.A., A.L.A.

Collections Clerk: Miss J. Philips, B.A.

With the increase of the library grant, it was possible to purchase a much larger number of books and also to open new subscriptions to periodicals. As it was decided in future to review books in the *Bulletin*, those received for this purpose were also added to the library. Accessions were also increased by the purchase of Professor Zeuner's library for the Institute; a start was made with these books and work also continued on the pamphlets from the Childe Bequest.

The student request for more reading time was met by arranging late opening of the library until 9 p.m. on Mondays, Tuesdays and Wednesdays during term. Even so the number of books borrowed during the year increased by almost 1,500.

During the winter term, the Librarian gave a short course on archaeological librarianship to three graduate students from the School of Librarianship of the North-Western Polytechnic. A student librarian, Miss Rosemary Munn, from the same school, spent her three weeks of practical training in the Institute library.

INSTITUTE OF ARCHAEOLOGY

The Librarian also gave a number of lectures on Underwater Archaeology to archaeological societies; and in the summer vacation again acted as co-director of the Motya excavations in Sicily.

The following is a summary of the additions made during the year:

<i>Books</i>	661	<i>Pamphlets</i>	480
Exchanged	58	Exchanged	20
Presented	178	Presented	417
Purchased	425	Purchased	42
<i>Periodicals</i>	396		
<i>Volumes bound</i>	220	<i>Lantern slides</i>	320

Volumes lent totalled 5,044, the highest month being October (784), the lowest August (122). 54 works were borrowed from outside libraries and 26 lent.

The following have presented books, periodicals and pamphlets:—

Dr. P. B. Adamson; Mr. F. K. Annable; Dr. E. Anati; Society of Antiquaries of London; Australian Institute of Aboriginal Studies; Miss L. Beigel; B. P. Belgium; Dr. S. Benitez Padilla; Mr. T. C. M. Brewster; British Archaeological Association; Miss Katherine H. Capes; Mr. Carrington; Mr. J. H. Chaplin; V. G. Childe Bequest; CIBA Review; Professor J. Desmond Clark; Professor K. de B. Codrington; Mr. J. N. Coldstream; Dr. I. W. Cornwall; Mrs. Aylwin Cotton; Dr. J. D. Cowen; Council for British Archaeology; Mr. D. M. Davies; Mr. A. P. Detsicas; Editor of *Discovery*; Mr. H. J. H. Drummond; Editor of *Endeavour*; Mr. W. A. Evans; Dr. Per Fett; Dr. Henry Field; Professor Forde; French Embassy; Professor S. S. Frere; Professor P-R Giot; Mr. H. A. I. Goonetilleke; Professor James B. Griffin; Professor W. F. Grimes; Dr. D. B. Harden; Professor C. F. C. Hawkes; Mr. H. W. M. Hodges; Dr. F. R. Hodson; Mr. E. W. Holden; Mrs. Vera Hollander; Institute of Classical Studies; International Centre for the Study of the Preservation and the Restoration of Cultural Property; Dr. Vassos Karageorghis; Winifred Lamb Bequest; Dr. D. M. Lang; Professor Seton Lloyd; Mr. T. G. Manby; Manshead Archaeological Society of Dunstable; Mrs. Maxwell Hyslop; Mr. J. V. S. Megaw; Mr. R. S. Merrillees; Miss T. M. I. Newbould; Dr. K. P. Oakley; Mr. T. P. O'Brien; Panepirotic Federation of America; Mr. P. J. Parr; Miss J. Philips; Mr. David Philips; Mr. E. Pyddoke; Dr. Robert L. Raikes; Mr. and Mrs. G. Rosselló; Professor Irving Rouse; Royal Ontario Museum; Dr. J. R. dos Santos Júnior; Mrs. J. R. Stewart; Professor T. Sulimirski; Dr. R. Summers; Swan's Hellenic Tours; Miss G. C. Talbot; Mr. M. J. Tamplin; Miss J. du Plat Taylor; Professor J. M. C. Toynbee; Miss M. Varese; Venezuela Comision Indigenista Nacional; Dr. Graham Webster; Sir Mortimer Wheeler; Mr. G. F. Willmot; Curator, Winchester Museums; Mr. Gilbert Wood.

REPORT OF THE DIRECTOR FOR THE SESSION 1963/64

STUDENTS' APPOINTMENTS

Dr. P. B. Adamson helped to organise and took part in the Oxford Expedition to the lapislazuli mines in Afghanistan.

Miss D. Collon was appointed temporary Research Assistant at the British Museum (Department of Western Asiatic Antiquities).

Mr. F. Dungey was appointed Technical Assistant at Winchester City Museum.

Mr. B. Eagles was appointed an Assistant Investigator to the Royal Commission on Historical Monuments (England).

Mrs. L. Glyn-Davies was appointed temporary research assistant to Professor M. E. L. Mallowan.

Mr. S. Harris was appointed Research Assistant in the Department of Egyptology, University College, London.

Miss Gillian Jones was appointed Illustrator with the Ministry of Public Building and Works Ancient Monuments Branch.

Mr. P. Langmaid was appointed Assistant Keeper in Archaeology at Norwich Museum.

Miss A. Madeira worked as draughtsman at the British School at Rome.

Dr. A. C. Patel has taken up the post of Lecturer in Environmental Archaeology in the University of Baroda.

Miss M. Pearce was appointed Research Assistant in the Director's Office at the British Museum.

Mr. J. Price was appointed Chief Technician in the Department of Archaeology, University of Ghana.

Dr. A. Rosenfeld was appointed a Research Assistant in the British Museum (British and Medieval Department).

Miss C. Stevens was appointed Technical Assistant in the British Museum (British and Medieval Department).

Miss M. White worked as a Conservator in the Hittite Museum, Ankara.

Miss G. Woodhouse was appointed Technical Assistant in the British Museum (British and Medieval Department).

Mr. J. Yasi worked as Museum Assistant in the Archaeological Museum, Teheran.

